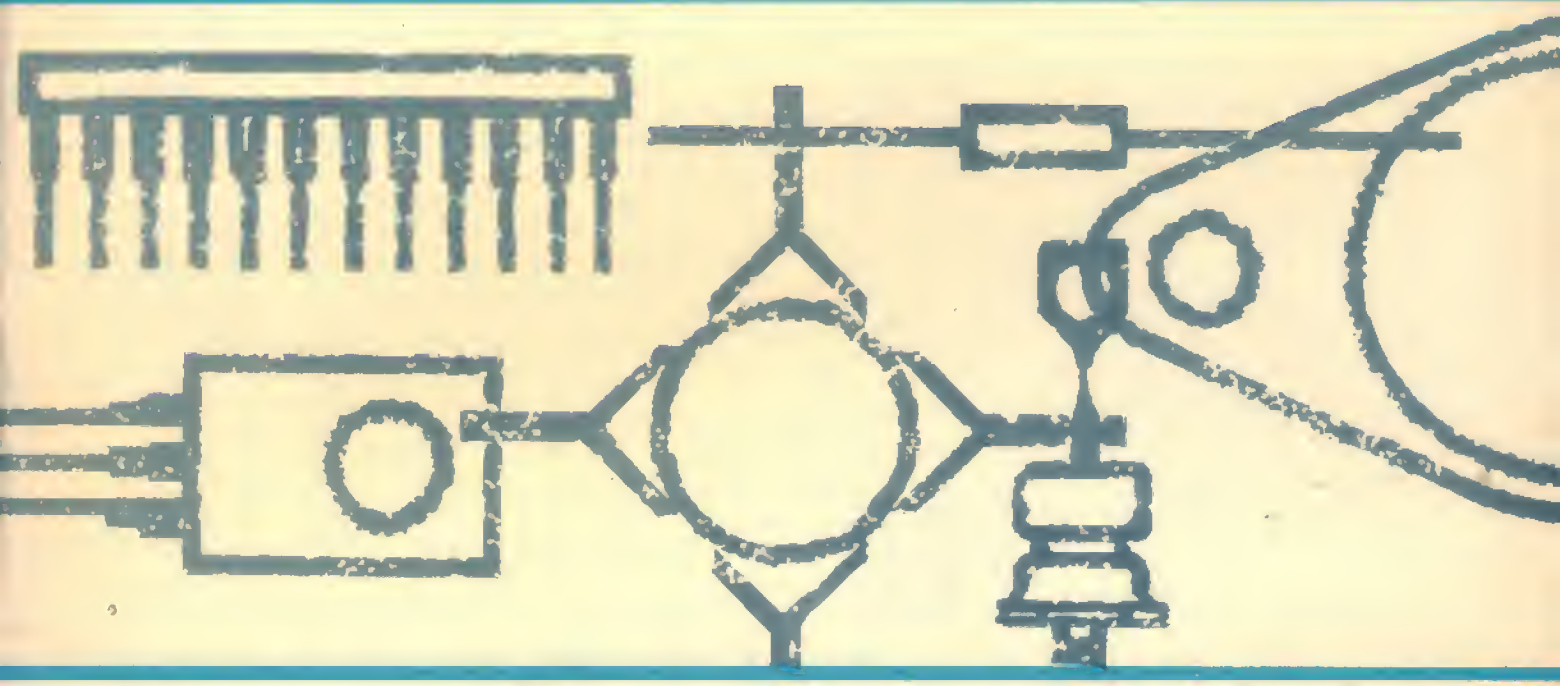
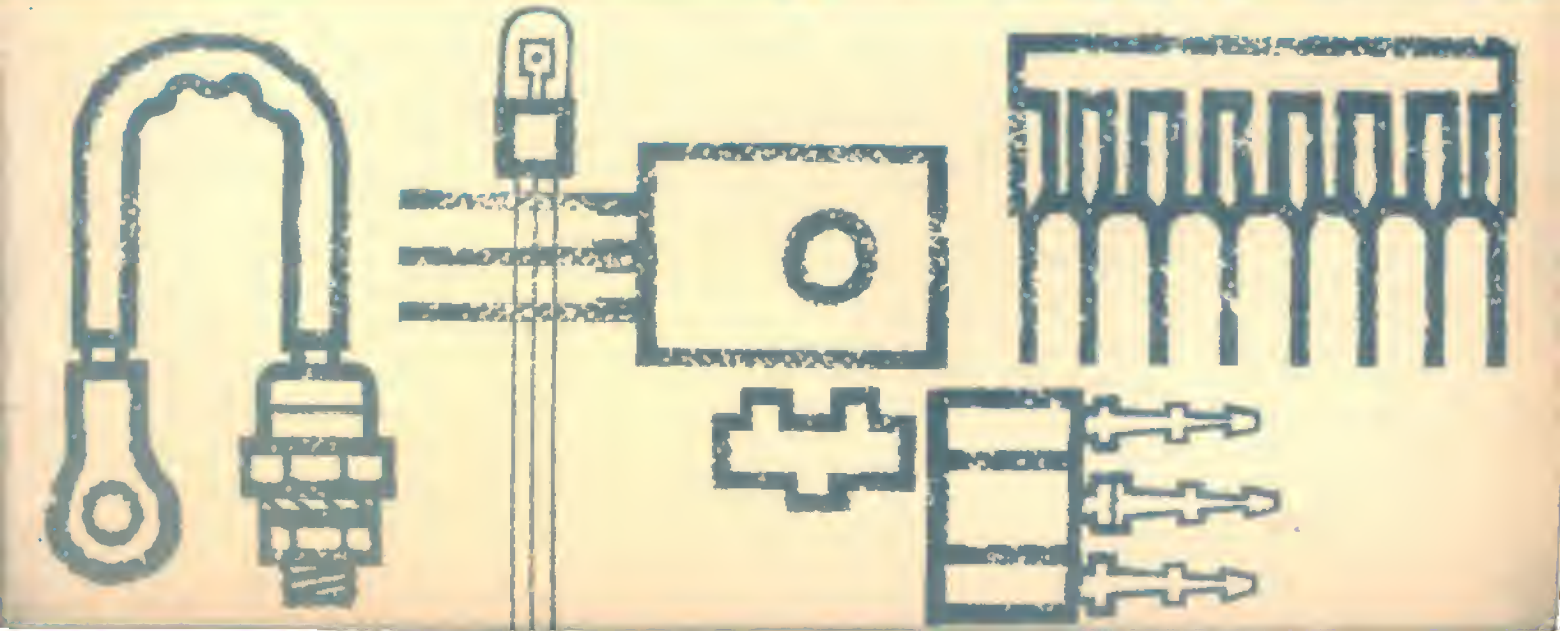
Mullard semiconductors 1974/5

Also available companion quick reference guides on passive components & valves and tubes





contents

Semiconductors quick reference guide 1974/75

This guide presents quick reference data on Mullard semiconductors.

Product information is deliberately abbreviated to give a rapid appreciation of salient characteristics, and to enable the performance of similar types to be compared quickly.

Full technical data on individual products, and details of the Mullard Technical Handbook, may be obtained from:

Central Technical Services
Mullard Limited
New Road
Mitcham, Surrey CR4 4XY
Telephone 01-648 3471 Telex 22194

For the convenience of Handbook users, the relevant book and part numbers are indicated at the top of each data table in this guide; data sheets for some new components may still be in preparation.

Mullard technical information service

Quick reference information
The most important characteristics of the current ranges of Mullard semiconductors are given in this guide.

Full technical data
Individual data sheets giving full technical data on each product are readily available, and may be obtained by quoting the relevant type number.
In addition, laboratory reports, applications reports and technical publications of many kinds are regularly issued.

Technical Handbook system
The Mullard Technical Handbook system of data is made up of three sets of books, each comprising several parts.
The three sets of books, easily identifiable by the colours on their covers, are as follows:

Book 1	(blue)	Semiconductor devices and integrated circuits
Book 2	(orange)	Valves and tubes
Book 3	(green)	Components materials and assemblies

New editions are issued at approximately yearly intervals.

New product information
As a further part of the information service, advance details of each new product or technique are published in the Mullard Bulletin, which is sent automatically to people who have asked to be kept informed of new introductions.

Index of data pages and status codes

Status codes
All of the semiconductor devices on which data is given in this book are Design or Current types. Maintenance and Obsolete types are listed below, and suggested alternatives are shown.

D Design Type. Recommended for new equipment designs.

C Current Type. Available for equipment production and for use in existing equipment installations. No longer recommended for new equipment designs.

M Maintenance Type. Available for the maintenance of existing equipments only. No longer recommended for equipment production.

O Obsolete Type. No longer generally available, though in some cases limited stocks may exist.

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Index of data pages and status codes (cont.)

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GFB7453D	D	9
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Mullard BS9000 Approved Devices

The following devices have been approved and are available to British Standards type specifications.

TRANSISTORS

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BCY70	BS9365–F009
BCY71	BS9365–F009
BCY72	BS9365–F009
BFX29	BS9365–F010
BFX30	BS9365–F011
BFY50	8S9365–F012
BFY51	8S9365–F012
BFY52	8S9365–F012
BC107	8S9365–F112
BC108	BS9365–F112
BC109	BS9366–F112

THYRISTORS

Type No.	B.S. Spec. No.
BTY79–100R	8S9341–F001
BTY79–200R	BS9341–F002
BTY79–300R	8S9341–F003
BTY79–400R	BS9341–F004
BTY79–500R	BS9341–F005
BTY79–600R	8S9341–F006
BTY79–700R	8S9341–F007
BTY79–800R	8S9341–F008
BTY79–1000R	8S9341–F009

DIODES

Type No.	B.S. Spec. No.
BZYBBC2V7to CV36	8S9305–N041
BYX52 Series	BS9331–F026
BYX50 Series	BS9331–F028
BYX30 Series	8S9333–F002
BYX25 Series	BS9333–F003

Devices in preparation and available shortly:

BD131 and BD132 to BS9365
BYX42 to BS9331—F047
BTW92 to BS9341—F039

Mullard D3000

The following GFB74 series will be supplied approved to the British Post Office D3000 class A specification for silicon monolithic bipolar integrated circuits.

D3000 No.	Compareble Type
D3400A	GFB7400D
D3401A	GFB7401D
D3401XA	GFB7401*D
D3402A	GF87402D
D3403A	GFB7403D
D3404A	GFB7404D
D3405A	GFB7405D
D3405XA	GF87405*D
D3410A	GFB7410D
D3413A	GFB7413D
D3420A	GF87420D

*15V variant

D3000 No.	Comparable Type
D3430A	GF87430D
D3440A	GFB7440D
D3442A	GFB7442D
D3450A	GF87450D
D3451A	GFB7451D
D3453A	GF87453D
D3454A	GFB7454D
D3470A	GFB7470D
D3472A	GFB7472D
D3473A	GFB7473D
D3474A	GFB7474D

D3000 No.	Compareble Type
D3475A	GF87475D
D3476A	GFB7476D
D3490A	GFB7490
D3493A	GFB7493D
D3495A	GF87495D
D34107A	GFB74107D
D34121A	GF874121D
D34153A	GF874153D
D34155A	GF874155D

CV Cross Reference List

Qualification Approval has been obtained for all CV7000 series devices eligible for conversion to BS93000 Appendix C and these are indicated in the list by means of a dagger, e.g. CV7130† to BS9300–C130. Qualification Approvals to the BS9000 scheme (including CV) are regularly listed in BS9002. For information on new or replacement types, please contact Mullard Ltd. The devices listed may not all be currently available.

C.V. No.	Compereble Type
CV448	OAB1
CV2154	SIM2
CV2155	SIM5
CV6712	CV7005
CV7001	AC128
CV7002	AC128
CV7005	AC128
CV7006	AC128
CV7026	8YX22–200
CV7027	BYX22–200
CV7028	8YX22–400
CV7029	BYX22–600
CV7030	BYX22–800
CV7040	OA202
CV7041	OA95

C.V. No.	Comparable Type
CV7043	OC200
CV7044	OC201
CV7064	OC23
CV7076	OA47
CV7083†	OC29
CV7084†	OC35
CV7085†	OC28
CV7086†	OC36
CV7089	OC170
CV7099†	BZY88C4V7
CV7100†	BZY88C6V1
CV7101†	BZY88C6V6
CV7102†	BZY88C6V2
CV7103†	8ZY88C6V8
CV7104†	BZY88C7V5

C.V. No.	Compareble Type
CV7105†	BZYBBCBV2
CV7106†	BZY88C15
CV7108	GEM3
CV7109	GEM4
CV7130†	OA91
CV7138†	8ZY88C3V3
CV7139†	8ZY88C3V6
CV7140†	BZY88C3V9
CV7141†	BZY88C4V3
CV7142†	BZY88C9V1
CV7143†	BZY88C10
CV7144†	BZYBBC11
CV7145†	BZY88C12

Mullard
CV List (cont.)

C.V. No.	Comparable Type
CV7148†	8ZY88C13
CV7158†	8ZY98C4V7
CV7159†	8ZY96C5V1
CV7160†	8ZY96C5V6
CV7161†	8ZY96C6V2
CV7162†	BZY96C6V8
CV7163†	8ZY96C7V5
CV7164†	8ZY96C8V2
CV7165†	8ZY96C9V1
CV7166†	8ZY95C10
CV7167†	BZY95C11
CV7168†	8ZY95C12
CV7171	BZY96C4V7
CV7172	BZY96C5V1
CV7173	BZY96C5V6
CV7174	BZY96C6V2
CV7175	8ZY96C8V8
CV7178	8ZY96C8V2
CV7177	8ZY96C9V1
CV7188†	OC205
CV7189	2/CV2154
CV7200	8ZY93C7V5R
CV7201†	8ZY93C8V2R
CV7202†	BZY93C9V1R
CV7203†	8ZY93C10R
CV7204†	8ZY93C11R
CV7205†	BZY93C12R
CV7206†	8ZY93C13R
CV7207†	8ZY93C15R
CV7208†	8ZY93C18R
CV7209†	BZY93C18R
CV7210†	8ZY93C20R
CV7211†	BZY93C22R
CV7212†	8ZY93C24R
CV7213†	8ZY93C27R
CV7214†	8ZY93C30R
CV7215†	8ZY93C33R
CV7218†	BZY93C36R
CV7217†	8ZY93C39R
CV7218†	8ZY93C43R
CV7219†	BZY93C47R
CV7220†	BZY93C51R
CV7221†	8ZY93C56R
CV7222†	8ZY93C62R
CV7223†	8ZY93C68R
CV7224†	BZY93C75R
CV7241	BZY93C6V8
CV7242	BZY93C7V5
CV7243†	BZY93C8V2
CV7244†	8ZY93C9V1
CV7245†	8ZY93C10
CV7246†	8ZY93C11
CV7247†	BZY93C12
CV7248†	BZY93C13
CV7249†	8ZY93C15
CV7250†	BZY93C16
CV7251†	BZY93C18
CV7252†	BZY93C20
CV7253†	BZY93C22
CV7254†	BZY93C24
CV7255†	8ZY93C27
CV7256†	8ZY93C30
CV7257†	8ZY93C33
CV7258†	8ZY93C36
CV7259†	8ZY93C39
CV7260†	8ZY93C43
CV7281†	BZY93C47
CV7262†	BZY93C51
CV7263†	BZY93C56
CV7264†	8ZY93C62
CV7265†	BZY93C68
CV7266†	8ZY93C75
CV7311	BYX38–300
CV7312	8YX38–300
CV7313	8YX38–600
CV7314	BYX38–900
CV7315	8YX38–900
CV7318	BYX38–300R
CV7317	BYX38–300R
CV7318	BYX38–600R
CV7319	BYX38–900R
CV7320	BYX38–900R
CV7329†	BTY91–100R
CV7330†	8TY91–200R
CV7331†	BTY91–400R
CV7332	OA202
CV7431†	BCY33

C.V. No.	Comparable Type
CV7342†	BCY34
CV7343	CV7346
CV7344†	8CY30
CV7345†	8CY31
CV7348†	8CY32
CV7347	OC202
CV7348	2N1302
CV7349	2N1304
CV7350	2N1306
CV7351	2N1308
CV7352	2N1303
CV7353	2N1305
CV7354	2N1307
CV7355	2N1309
CV7383	BCZ11
CV7387	IN914
CV7368	IN916
CV7359†	OA91
CV7376†	ACY17
CV7379†	8YX42–300R
CV7380†	8YX42–600R
CV7381†	BYX42–900R
CV7382†	BYX42–900R
CV7383	BYX42–1200R
CV7384†	BYX42–300
CV7385†	8YX42–600
CV7386†	BYX42–900
CV7387†	8YX42–900
CV7388	8YX42–1200
CV7409†	8ZY96C4V7
CV7410†	8ZY96C5V1
CV7411†	8ZY96C5V5
CV7412†	BZY96C6V2
CV7413†	BZY96C6V8
CV7414†	BZY96C7V5
CV7415†	8ZY96C8V2
CV7418†	8ZY96C9V1
CV7417†	BZY95C10
CV7418†	8ZY95C11
CV7419†	8ZY95C12
CV7420†	8ZY95C13
CV7421†	8ZY95C16
CV7422†	8ZY95C10
CV7423†	BZY95C18
CV7424†	BZY95C20
CV7425†	8ZY95C22
CV7426†	8ZY95C24
CV7427†	BZY95C27
CV7428†	BZY95C30
CV7429†	8ZY95C33
CV7430	BSY26
CV7431	8SY27
CV7436†	ACY18
CV7437†	ACY19
CV7438†	ACY20
CV7439†	ACY21
CV7478†	BYX45
CV7494†	OC20
CV7495†	2N696
CV7496†	2N697
CV7580†	2N1131
CV7581†	2N1132
CV7582†	8TY79–100R
CV7583†	8TY79–200R
CV7584†	8TY79–400R
CV7644†	2N718
CV7648	BSY95A
CV7649†	BTY91–100R
CV7650†	8TY91–200R
CV7651†	8TY91–400R
CV7652†	8TY91–600R
CV7653†	8TY91–800R
CV7667†	8YX25–1000R
CV7668†	8YX25–1000
CV7669†	2N2904
CV7670†	2N2905
CV7671†	2N2904A
CV7672†	2N2905A
CV7673†	2N2906
CV7674†	2N2907
CV7675†	2N2906A
CV7676†	2N2907A
CV7678†	BZY91C10
CV7679†	BZY91C11
CV7680†	BZY91C12
CV7881†	8ZY91C13
CV7882†	BZY91C15

C.V. No.	Comparable Type
CV7683†	8ZY91C16
CV7684†	BZY91C18
CV7685†	8ZY91C20
CV7688†	8ZY91C22
CV7687†	8ZY91C24
CV7688†	8ZY91C27
CV7689†	8ZY91C30
CV7690†	8ZY91C33
CV7691†	8ZY91C36
CV7692†	8ZY91C39
CV7693†	8ZY91C43
CV7694†	BZY91C47
CV7695†	8ZY91C51
CV7696†	8ZY91C56
CV7697†	BZY91C62
CV7698†	BZY91C68
CV7699†	BZY91C75
CV7700†	8ZY91C10R
CV7701†	8ZY91C11R
CV7702†	BZY91C12R
CV7703†	8ZY91C13R
CV7704†	8ZY91C15R
CV7705†	BZY91C16R
CV7706†	BZY91C18R
CV7707†	BZY91C20R
CV7708†	8ZY91C22R
CV7709†	BZY91C24R
CV7710†	8ZY91C27R
CV7711†	8ZY91C30R
CV7712†	BZY91C33R
CV7713†	8ZY91C36R
CV7714†	8ZY91C39R
CV7715†	BZY91C43R
CV7716†	8ZY91C47R
CV7717†	8ZY91C51R
CV7718†	8ZY91C56R
CV7719†	BZY91C62R
CV7720†	BZY91C68R
CV7721†	8ZY91C75R
CV7722†	BFY50
CV7723†	8FY51
CV7724†	BFY52
CV7725†	8FY50
CV7726†	8FY51
CV7727†	8FY52
CV7740†	ACY44
CV7746	8CY39
CV7747	8CY40
CV7762†	AAY39
CV7771†	AAY56
CV7772†	AAY56R
CV7776†	AAY51
CV7777†	AAY51R
CV7778†	AAY51/51R
CV7780†	8ZY93C6V8R
CV7781†	BZY93C7V5R
C87782†	8ZY93C8V2R
CV7783†	BZY93C9V1R
CV7784†	8ZY93C10R
CV7785†	8ZY93C11R
CV7786†	8ZY93C12R
CV7787†	8ZY93C13R
CV7788†	8ZY93C15R
CV7789†	BZY93C16R
CV7790†	BZY93C18R
CV7791†	8ZY93C20R
CV7792†	BZY93C22R
CV7793†	8ZY93C24R
CV7794†	8ZY93C27R
CV7795†	BZY93C30R
CV7795†	8ZY93C33R
CV7797†	BZY93C36R
CV7798†	8ZY93C39R
CV7799†	BZY93C43R
CV7800†	8ZY93C47R
CV7B01†	BZY93C51R
CV7802†	BZY93C56R
CV7803†	8ZY93C62R
CV7804†	BZY93C68R
CV7805†	8ZY93C75R
CV7808†	BZY93C6V8
CV7807†	8ZY93C7V5
CV7808†	8ZY93C8V2
CV7809†	8ZY93C9V1
CV7810†	BZY93C10
CV7811†	8ZY93C11
CV7812†	BZY93C12

C.V. No.	Comparable Type
CV7813†	8ZY93C13
CV7814†	8ZY93C15
CV7815†	8ZY93C16
CV7816†	8ZY93C18
CV7817†	8ZY93C20
CV7818†	8ZY93C22
CV7819†	8ZY93C24
CV7820†	8ZY93C27
CV7821†	8ZY93C30
CV7822†	8ZY93C33
CV7823†	8ZY93C36
CV7824†	BZY93C39
CV7825†	8ZY93C43
CV7828†	BZY93C47
CV7827†	8ZY93C51
CV7828†	8ZY93C58
CV7829†	8ZY93C62
CV7830†	8ZY93C68
CV7831†	8ZY93C75
CV7838	AAY50
CV7839	AAY50R
CV7B41†	8ZY95C36
CV7842†	BZY95C39
CV7843†	8ZY95C43
CV7844†	8ZY95C47
CV7845†	BZY95C51
CV7846†	8ZY95C56
CV7847†	BZY95C62
CV7B48†	8ZY95C68
CV7849†	8ZY95C75
CV7873	8SX60
CV7874	8SX59
CV7875	OA202
CV8308	8YX26–60
CVB475	8ZY88C5V5
CV8510	8ZY88C7V5
CV8515	8SX76
CV8618	BSX77
CV8617	8AX13
CV8760	BCY31
CV8790	8AX16
CV8805	BYX26–150
CV8841	8CY34
CV8842	BCY31
CV8985	8ZY88C6V2
CV9023	8CY72
CV9088	OC71
CV9084	8ZY88C20
CV9259	AC128
CV9297	8TX18–200
CV9507	8FX30
CV9543	8CY72
CV9837	8AX13
CV9638	8AV10
CV9790	BFX29
CV9919	8YX30–200
CV9935	8UY87
CV10253	BFX85
CV10254	BFX85
CV10440	8C107
CV10808	8C109
CV10807	8FX30
CV10814	8CY71
CV10887	8ZY88C18
CV10889	2/8ZY88C4V7
CV11080	ACY22
CV11123	ACY22

Integrated circuits
GFB family of TTL integrated circuits book 1 part 6

GENERAL DATA

Supply voltage	+5·0V ±5%
Typ. noise immunity	1·0V
Fan-out	10
Operating temperature range	0 to +70°C

RATINGS

Limiting values of operation according to the absolute maximum system

		min.	max.	
Electrical				
V_{CC}	Pin potential to ground	−0·5	7·0	V
V_{in}	Input voltage d.c.	−0·5	5·5	V
Temperature				
T_{stg}	Storage temperature	−65	150	°C
Operating Conditions				
V_{CC}	Supply voltage	5·0±5%		V
T_{amb}	Ambient temperature	0	70	°C

LOGIC LEVELS

V_{OH}	Output voltage 'High'	2·4	—	V
V_{OL}	Output voltage 'Low'	—	0·4	V
V_{IH}	Input voltage 'High'	2·0	—	V
V_{IL}	Input voltage 'Low'	—	0·8	V

LOADING RULES

1 unit load = 1 standard TTL gate input load		—	1·6	mA

SPECIAL FEATURES

- The input/output characteristics provide easy interfacing with other TTL families
- Input diode clamping

PACKAGING—Available in ceramic (suffix D) packages.
(14 lead—outline AU1.16 lead—outline AU2).

- Device pinning is identical to the 7400 series.

IMPORTANT NOTE

All the GFB74 series will be supplied to conform to the British Post Office Specification for digital integrated circuits D3000 Class A.
e.g. GFB7400D conforms to D3400A, etc.

Type No.	D3000 No.	Type No.	D3000 No.	Type No.	D3000 No.
GFB7400D	D3400A	**GFB7442D**	D3442A	**GFB7493D**	D3493A
GFB7401D	D3401A	**GFB7450D**	D3450A	**GFB7495D**	D3495A
15V variant	D3401XA	**GFB7451D**	D3451A	**GFB74107D**	D34107A
GFB7402D	D3402A	**GFB7453D**	D3453A	**GFB74121D**	D34121A
GFB7403D	D3403A	**GFB7454D**	D3454A	**GFB74153D**	D34153A
GFB7404D	D3404A	**GFB7470D**	D3470A	**GFB74155D**	D34155A
GFB7405D	D3405A	**GFB7472D**	D3472A		
15V variant	D3405XA	**GFB7473D**	D3473A		
GFB7410D	D3410A	**GFB7474D**	D3474A		
GFB7413D	D3413A	**GFB7475D**	D3475A		
GFB7420D	D3420A	**GFB7476D**	D3476A		
GFB7430D	D3430A	**GFB7490D**	D3490A		
GFB7440D	D3440A				

Integrated circuits
GFB family of TTL integrated circuits (cont.)

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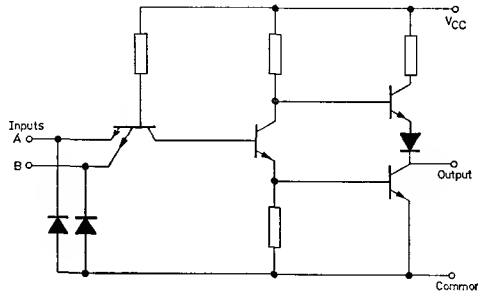
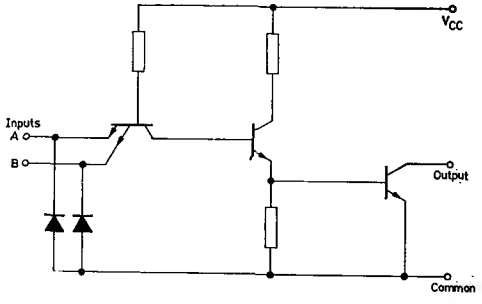
GATES

Typical equivalent circuit.



Typical equivalent circuit of gate with single-ended open-collector output transistor.



Type No.	Description	Propagation Delay (Typ.) (ns)	Av. Power Dissipation (per Gate, 25°C) (50% Duty Cycle) (mW)
GFB7400D	Quadruple 2-input NAND gate	13	10
***GFB7401D**	Quadruple 2-input positive NAND gate with wired-OR capability	30	10
GFB7402D	Quadruple 2-input positive NOR gate	13	14·2
GFB7403D	Quadruple 4-input NAND gate with open collector output transistor	30	10
GFB7404D	Sextuple single-input inverter gate	13	10
***GFB7405D**	Sextuple single-input inverter gate open collector output transistor	30	10
GFB7410D	Triple 3-input NAND gate	13	10
†**GFB7413D**	Dual 4-input SCHMITT-TRIGGER (positive NAND gate)	17	42
GFB7420D	Dual 4-input NAND gate	13	10
GFB7430D	Single 8-input NAND gate	13	10
GFB7440D	Dual 4-input NAND buffer gate	13	26·5
GFB7450D	Dual AND/OR/NOT 2-level logic circuit	13	14·2
GFB7451D	Dual AND/OR/NOT 2-level logic circuit	13	14·2
GFB7453D	8-input AND/OR/NOT 2-level logic circuit	13	28·5
GFB7454D	4-wide 2-input AND/OR/NOT gate	13	28·5

*15 Volt variants also available

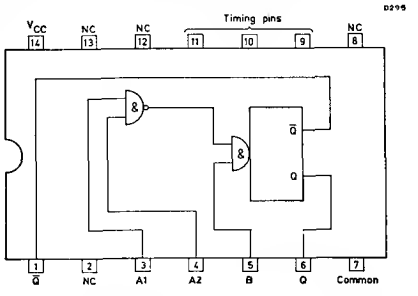
†In development—available later.

Integrated circuits
GFB family of TTL integrated circuits (cont.)

MONOSTABLE

GFB74121D

Monostable circuit d.c. triggered from positive or gated negative going inputs with inhibit facilities

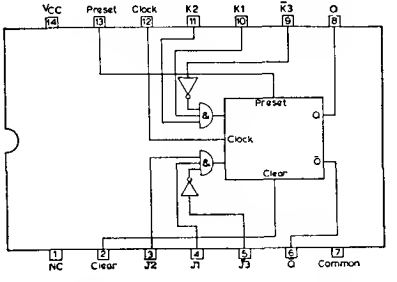


Av. power dissipation	90mW

BISTABLES

GFB7470D

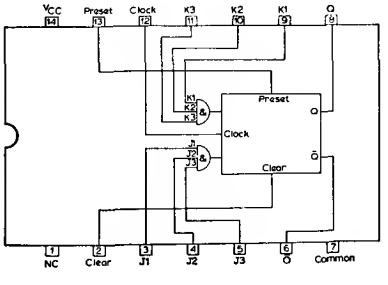
Single edge-triggered JK flip-flop with dual J and K inputs and $\overline{J}$ and $\overline{K}$ inputs



Max. clock rate	20MHz
Av. power dissipation	70mW

GFB7472D

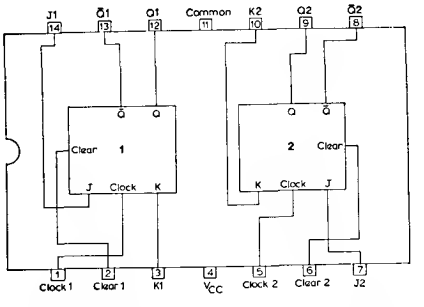
Master slave JK flip-flop with triple J and K inputs.



Max. clock rate	10MHz
Av. power dissipation	40mW

GFB7473D

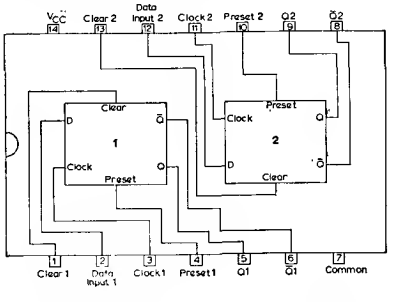
Dual master-slave JK flip-flop with single J and K inputs



Max. clock rate	10MHz
Av. power dissipation	40mW

GFB7474D

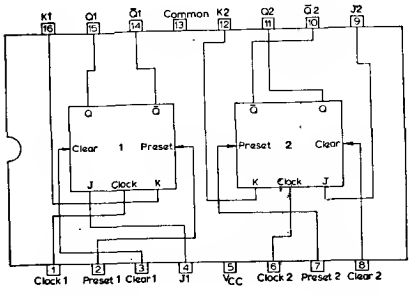
Edge-triggered dual D-type flip-flop with direct, clear and preset inputs, complementary Q and $\overline{Q}$ outputs.



Max. clock rate	15MHz
Av. power dissipation	42·5mW

GFB7476D

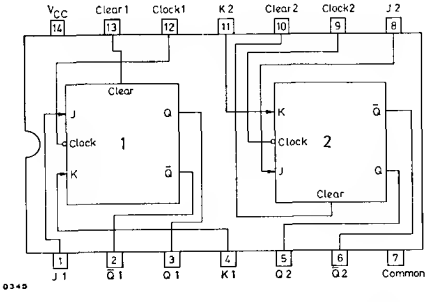
Dual master-slave JK flip-flop with single J, K, preset and clear inputs (16-lead DIL)



Max. clock rate	10MHz
Av. power dissipation	40mW

†GFB74107D

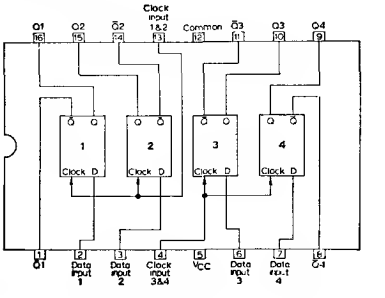
Dual master-slave JK flip-flop with single J and K inputs.



Max. clock rate	10MHz
Av. power dissipation	40mW

GFB7475D

Quadruple bistable latching circuits with Q and $\overline{Q}$ outputs for use as temporary storage of binary information or as dual master-slave flip-flop with two-phase clocking (16-lead DIL)



Av. power dissipation	160mW

†In development—available later.

Integrated circuits
GFB family of TTL integrated circuits (cont.)

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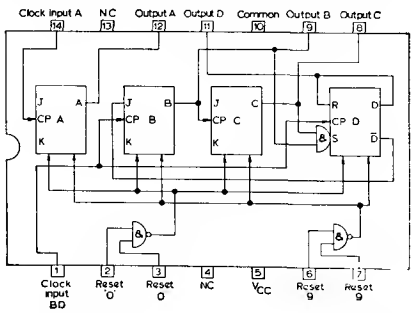
COUNTERS

† GFB7490D

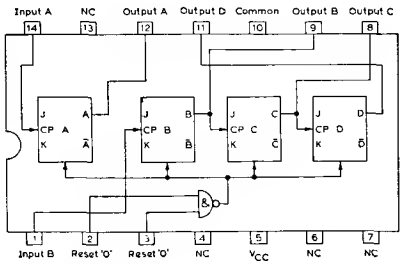
High speed decade counter consisting of four master slave flip-flops permitting three independent count modes



Max. clock rate	10MHz
Av. power dissipation	160mW

† GFB7493D

4-bit binary counter consisting of four master-slave flip-flops internally connected to provide a divide-by-two and divide-by-five counters



Max. count frequency	10MHz
Av. power dissipation	128mW

DATA SELECTOR/ MULTIPLEXERS

† GFB74153
† GFB74155

The GFB74153 is a dual 4-line-to-1-line data selector/multiplexer.
The GFB74155 is a dual 2-line-to-4-line data selector/multiplexer.

(16-lead DIL)	Av Power dissipation
GFB74153	180mW
GFB74155	125mW

SHIFT REGISTER

† GFB7495D

4-bit right-left shift register

Maximum shift frequency	36MHz
Power dissipation (typ.)	195mW

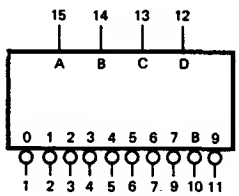
Pin No.		Pin No.	
1	serial input	8	clock 2, left shift
2	input A	9	clock 1, right shift
3	input B	10	output D
4	input C	11	output C
5	input D	12	output B
6	mode control	13	output A
7	common	14	V_{cc}

†In development—available later.

DECODER

GFB7442D

BCD to Decimal decoder
(16-lead DIL)



V_{CC} = Pin 16
GND = Pin 8

Average power dissipation	140mW

Integrated circuits
GXB 10,000 family of CML integrated circuits

book 1 part 6

Type No.	Description	Propagation Delay (Typ.) (ns)	Power consumption per package (mW)
GXB10101	Quadruple OR/NOR gate with strobe		
GXB10102	Quadruple NOR gate	2·0	100
GXB10105	Triple OR/NOR gate	2·0	75
GXB10106	Triple 4-3-3 input NOR gate		
GXB10107	Triple exclusive OR/exclusive NOR gate	2·4	115
GXB10109	Dual OR/NOR gate	2·0	50
GXB10110	Dual 3-input/3-output OR line driver	2·4	150
GXB10111	Dual 3-input/3-output NOR line driver	2·4	150
***GXB10114**	Triple line receiver		
GXB10115	Quadruple line receiver	2·0	95
GXB10117	Dual OR-AND/OR-AND-INVERT gate	2·3	100
GXB10118	Dual OR/AND gate	2·3	100
GXB10119	OR/AND gate	2·3	100
GXB10121	4-wide OR-AND/OR-AND-INVERT gate	2·3	100
***GXB10124**	Quad TTL-MECL Translator		
***GXB10125**	Quad MECL-TTL Translator		
GXB10130	Dual D-LATCH	2·0	110
GXB10131	Dual D-type Master-Slave flip-flop	2·0	230
GXB10132	Dual Multiplexer with latch (common reset)	3·0	210
GXB10133	Quad latch with output enable	3·0	310
GXB10134	Dual Multiplexer with latch	3·0	—
***GXB10136**	Universal binary counter	3·3	—
***GXB10137**	Universal decade counter	3·3	—
***GXB10149**	256×4 Programmable read only memory	—	—
GXB10160	12-bit parity Checker/Generator	4·5	310
GXB10161	Three-bit decoder (one of eight lines low)	4·0	490
GXB10162	Three-bit decoder (one of eight lines high)	4·0	490
GXB10164	Eight input Multiplexer	4·2	490
***GXB10165**	Priority decoder	—	—
***GXB10173**	Quad 2-input Multiplexer with latch	—	—
GXB10174	Dual 4–1 Multiplexer	3·5	325
***GXB10175**	Quintuple latch	—	—
GXB10179	Look ahead carry block	3·0	250
***GXB10180**	Dual High Speed adder/subtractor	—	—
GXB10181	4-bit arithmetic logic unit	7·0	600
***GXB10210**	High speed 3 input/3 output OR gate	—	—
***GXB10211**	High speed 3 input/3 output NOR gate	—	—
***GXB10214**	High speed triple differential line receiver	—	—
***GXB10231**	High Speed, Dual D flip-flop	—	—
***GXB95410**	256-bit Random access memory	—	—

* In development—for availabillty consult Mullard Ltd.

MOS Integrated circuits
FD, FE and GY family book 1 part 6

A series of complex monolithic integrated circuits using MOS P-channel enhancement mode technology.

D.C. noise margin (min.) 1·0V

Operating temperature range FD family −55 to +85°C
0 to +75°C

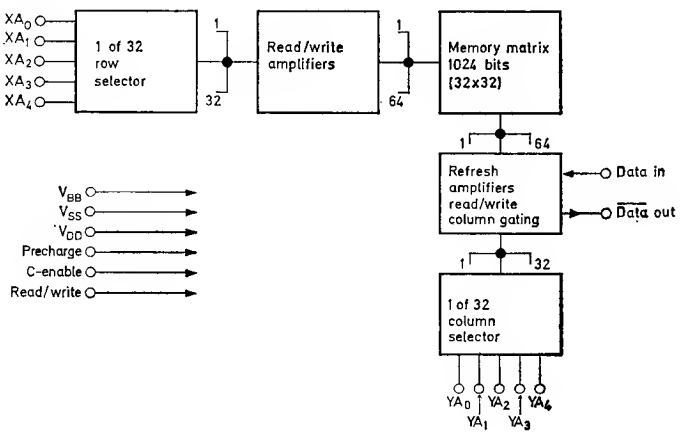
READ/WRITE RANDOM ACCESS MEMORIES

GYQ101/111/131

1024-bit read/write random access memories

	GYQ 101	111	131
Supply voltages V_{SS}	16	16	16V
V_{BB}–V_{SS}	3–4	3–4	3–4V
Cycle time (min.)	500	390	315ns
Access time	300	220	150ns
Stand by power	3·0	6·0	4·0 μW/bit

18-lead dual-in-line package.



READ ONLY MEMORIES

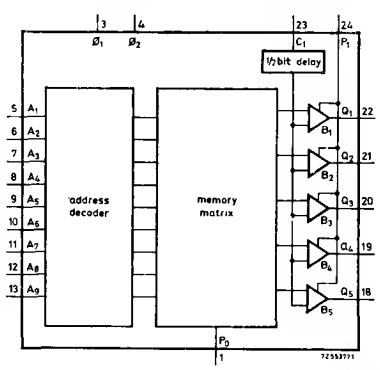
Power dissipation (f = 1MHz): 90mW 24-lead ceramic dual-in-line package (outline AW)

These memories are available with either an optional or a standard bit pattern as follows:

Optional bit pattern

FDR116Z

Read only memory, 512-word, 5 bits per word

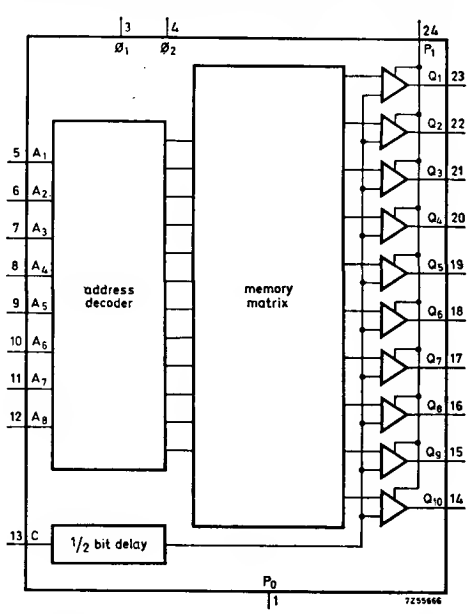


Read access time (max.) 850ns

Clock rate (max.) 1·2MHz

FDR126Z

Read only memory, 256-word, 10 bits per word.

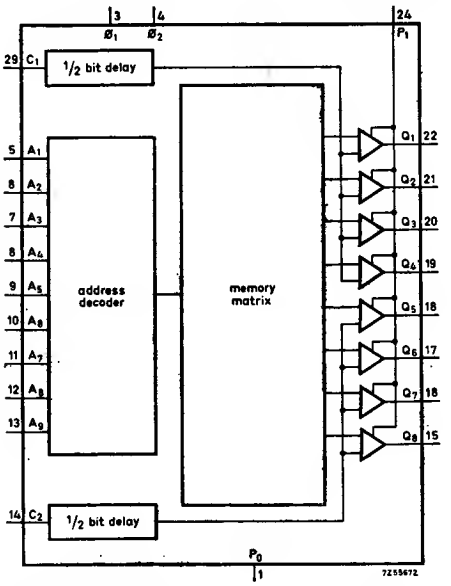


Read access time (max.) 1μs

Clock rate (max.) 1MHz

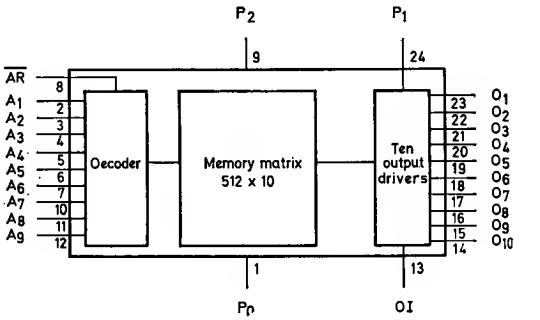
MOS Integrated circuits
FD, FE and GY family (cont.) book 1 part 6

FDR131Z
Read only memory, 512-word, 8 bits per word.



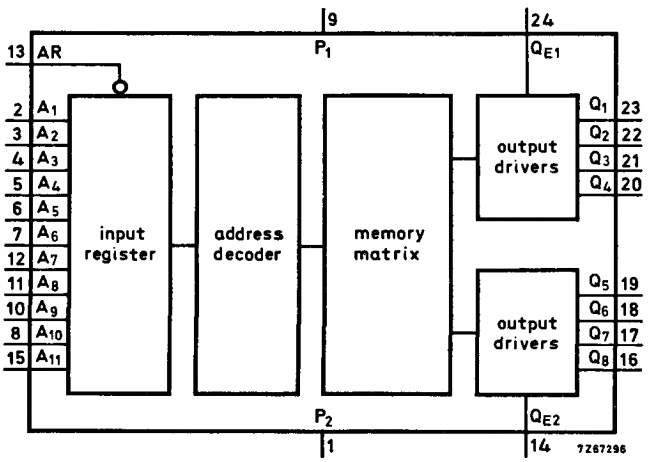
Read access time (max.)	1·5μs
Clock rate (max.)	0·66MHz

FDR146Z
Static read only memory, 512-word, 10 bits per word.



FDR151Z
Static read only memory, 2,048 words, 8 bits per word.

FDR151BZ
As FDR151Z but in DIL plastic encapsulation.



MOS Integrated circuits
FD, FE and GY family (cont.) book 1 part 6

READ ONLY MEMORIES (cont.)

Set bit pattern

The following read-only-memories are available as standard product in pre-programmed version where the bit pattern is fixed to perform the selected function and also to serve for preliminary investigations by the customer before the final bit pattern is established.

FDR116Z1

Identical to FDR116Z but with fixed bit pattern for dot code matrix ASCII character generator (row scan).

FDR116Z2

Identical to FDR116Z but with fixed bit pattern for Character Generator (5×7 dot matrix; row scan system).

FDR126Z1

Identical to FDR126Z but with fixed bit pattern to convert from both ASCII to selectric line code and selectric line code to ASCII

FDR131Z1

Identical to FDR131Z but with fixed bit pattern to convert from both 7-bit ASCII to 8-bit EBCDIC and from 8-bit EBCDIC to 7-bit ASCII. Either odd or even parity ASCII can be used as inputs to the R.O.M.

FDR131Z2

Identical to FDR131Z but with fixed bit pattern for Character Generator (5×7 dot matrix; column scan system)

FDR146Z1

Identical to FDR146Z but with fixed bit pattern for character generation. The memory contains 64 ASCII encoded symbols. Each high resolution character is a 7× 9 matrix organised for column scanning

FDR146Z2

Identical to FDR146Z but with fixed bit pattern for Static Character Generator upper and lower case (5×7 dot matrix; row scan system).
FDR146B, BZ1, BZ2 as FDR146Z but in plastic DIL package.

Desk calculators

FDY Series

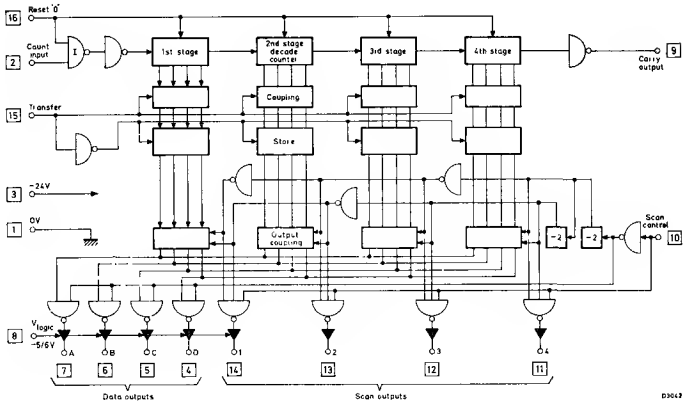
The FDY Series provides the basic circuitry for all calculator functions. The series is made up of thirteen units and these can be incorporated into larger systems The range is primarily designed for desk calculators and application notes are available.
The circuits are provided in 24 pin, 28 pin or 40 pin dual-in-line hermetic packages.

Decade counters

FEJ271 Quad decade counter/store

FEJ271 is an MOS/LSI counting module for use in low speed counting applications. It consists of 4-decade counting stages with a carry output

Maximum counting speed 1MHz
16-lead dual-in-line package.

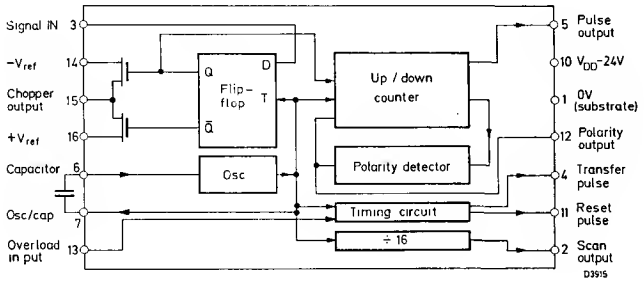


Analogue to Digital Converter

FEY101

The FEY101 contains the logic section of an integrating type A-D converter designed for use in economic digital voltmeter systems. It is intended to be used with an FEJ271 quad-decade counter, an operational amplifier and decoder driver and a few discrete components to form a complete voltmeter.

Measuring range is ±2000 divisions.
16-lead dual-in-line package.

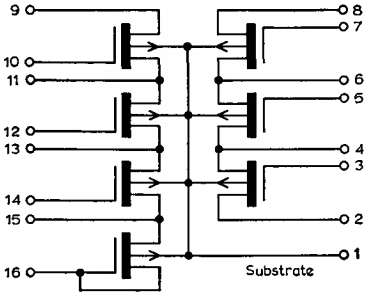


MOS Integrated circuits (cont.)
multiple transistor array book 1 part 6

GKY102

The GKY102 is a monolithic intergated p-channel enhancement MOS circuit comprising seven identical interdigitated MOS transistors with their drains and sources connected internally as shown in the circuit diagram.

It is ideally suited for breadboarding 4-phase logic circuits and other ratio-less type dynamic circuits as well as for general switching applications since each transistor has a typical ON resistance of 300 ohms. All external gate input connections have a protection device incorporated to prevent damage by electrostatic charges during normal handling.



Max. clock voltage	−30	V
'ON' resistance at $-V_{GS} = 25V$	170–540	Ω
Operating temperature range	−55 to +125	°C

16-lead hermetic-in-plastic dual-in-line package.

linear integrated circuits book 1 part 7

OPERATIONAL AMPLIFIERS

Type No.	Description and Construction		Nominal Supply Voltage (V)	Output Voltage (V)	Input Impedance (kΩ)	Output Impedance (Ω)	Input Offset Voltage (mV)	Gain (Typ.)	Operating Temperature Range (°C)
TBA221 **TBA221B** **TBA221D**	Operational amplifier	AP1 AU3 AS	+15 −15	±14	1000	—	2	100000	0 to +70
TBA222	Operational amplifier	AP1	+15 −15	±14	1000	—	1	200000	−55 to +125
TCA220	Triple operational amplifier	AU2	+6 −6	+3·5 −6	25	—	2	4000	−55 to +125
TCA410A **TCA410B**	Voltage follower	J7	+15 −15	±13·5	Input Current 1nA max 3nA max	1Ω	3	0·995	−25 to +70°C
TCA490A **TCA490B** **TCA490C**	Dual operational amplifier and Stereo pre-amplifier	AU1	+12 −12	±8 ±8	Slewrate V/µs 5	noise fig. (µv) 4 2·5 1·25	0·5	12000	0 to +70°C
TCA520B	Operational Amplifier (low voltage range)	AU3	5 −0·1	+0·1	50	—	2	40000	−25 to +70°C
TCA680 **TCA680B**	Operational Amplifier	AP1 AU3	+15 −15	±12·5	20	—	2	20000	0 to +70°C

Integrated circuits
linear integrated circuits (cont.) book 1 part 7

AUDIO AMPLIFIERS

Type No.	Description and Construction		Nominal Supply Voltage (V)	Input Impedance (kΩ)	Load Impedance (Ω)	Output Power (mW)	Noise Figure	Gain (Typ.)	Operating Temperature Range (°C)
OM200/S2	Hearing aid amplifier	P	5	—	—	0·2	<6dB	80dB	−20 to +80
TAA263	Linear A.F. amplifier	J8*		—	150	10	5dB	77dB	−20 to +100
TAA300	Linear A.F amplifier	AP2	9	15	8	1W	⩽20nW	V_{in} = 8·5mV	−55 to +150
TAA310A	Low-noise A.F. amplifier	AP2	7	20	—	2·0V_{rms}‡	(30Hz to 15kHz) 2·5dB	100dB	−20 to +60
TAA370	Hearing aid amplifier	AT	1·3	—	—	1·5	3dB	90dB	−20 to +85
TAA960	Triple amplifiers for active filters	AP2	+6	(each amplifier) 25	Output impedance 9 or 0.5KΩ	Output Power (mW)	—	(each amplifier) 39dB	−55 to +65
TBA915	Low current drain A.F. amplifier	AP2	18	9	20	500	—	V_{in}= 10mV	−55 to +125
TCA160/B/C	A.F. amplifier	AU2**	12	15	8	2·1W†	—	1·0nW 70dB	−25 to +125
TCA160Q/BQ/CQ		AV							

			Supply Current (mA)	Input Impedance (kΩ)	Output Impedance (Ω)	Output Voltage (mV)	Noise Figure	Gain	Operating Temperature Range (°C)
TCA210	Pre-amplifier and output amplifier	AU2	12	0·5	800	2·5	6dB	10000	−55 to +125
TCA210D		CF		17	15	800	—	500	

			V_{GSO} max. (V)	V_{DS} max. (V)	I_D max. (mA)	gm (mA/V)	r_{sg} min. (GΩ)
TAA320	MOST L.F. Pre-amplifier	G3	−20	−20	25	40	100

*J8 connections are as follows 1 Input 2 Positive supply 3 Output 4 Common and negative supply

**Dual-in-line with heatsink.

†at onset of dipping
‡output voltage

Integrated circuits

linear integrated circuits (cont.) book 1 part 7

RADIO CIRCUITS

Type No.	Description and Construction		Supply Voltage (V)	Output power (W)	A.G.C. Range (dB)	Sensitivity (μV)	Distortion (%)	Operating Temperature Range (°C)
TBA570 **TBA570Q**	AM/FM receiver circuit	AU2 AV	3·6 to 12	1	65	16 15	1	−20 to +125
TBA690	AM/FM receiver circuit	AU2	2·7 to 11·4	0·6	60	4	1	−20 to +125
TBA700	AM/FM receiver circuit	AU2	9	1	60	15	1	−20 to +125

				Channel separation (dB)	Input voltage (V)	Voltage gain (dB)		
TCA290A	Stereo decoder circuit	AU2	15	40	1 p-p	8–12	0·2	−30 to +80

			Supply Voltage (V)	Output Voltage (mV)	Limiting Voltage (μV)	Voltage gain (dB)	Distortion (%)	Temperature Range (°C)
TCA420A	I.F. amplifier for F.M.	AU2	15	15	35	65	0·8	−25 to +80

TELEVISION CIRCUITS

Nominal Supply Voltage : 12V
Operating Temperature Range: −20 to+60°C

Type No.	Description and Construction		Functions
TBA480	FM–I.F. amplifier and demodulator		For audio section intercarrier I.F. amplifier and demodulator. Can also be used in F.M. broadcast receivers.
TBA500N **TBA500NQ** **TBA500P** **TBA500PQ**	Luminance combination	AU2 AV	Delay line matching stage. Gated black level clamp. D.C contrast control. Beam current limiter.
TBA510 **TBA510Q**	Chrominance combination	AU2 AV	Variable gain A.G.C. chroma amplifier. D.C. control for saturation. Chroma blanking and burst gate function. Burst output stage. Colour killer and PAL delay line driver stage.
TBA520 **TBA520Q**	Colour demodulator	AU2 AV	Dual active synchronous demodulator for R-Y and B-Y chrominance signals matrix. PAL phase switch and flip-flop.
TBA530 **TBA530Q**	R-G-B matrix amplifier	AU2 AV	R-G-B- matrix pre-amplifier with low thermal drift.
TBA540 **TBA540Q**	Reference combination	AU2 AV	Phase and amplitude controlled reference oscillator using quartz crystal. Synchronous demodulator circuit. A.C.C., colour killer and identification signal generator.
TBA550 **TBA550Q**	Television signal processing circuit	AU2 AV	Video pre-amplifier. Sync. separator, phase detector. A.G.C. for r.f. and i.f. stages. Blanking for video amplifier. Noise protection circuits.
TBA560 **TBA560Q**	Luminance & chrominance combination	AU2 AV	Combines the functions of TBA500/Q and TBA510/Q
TBA720A **TBA720AQ**	Line oscillator	AU2 AV	Line oscillator with D.C. controls and square-wave output.
TBA750 **TBA750Q**	Limiter amplifier	AU2 AV	Limiter amplifier, f.m. detector, d.c. volume control and a.f. amplifier.
TBA920C **TBA920CQ**	Line oscillator circuit	AU2 AV	Sync. pulse separator, noise gate. Line oscillator, phase control. Line driver output stage.

Integrated circuits
linear integrated circuits (cont.) book 1 part 7

TELEVISION CIRCUITS (cont.)

Type No.	Description and Construction		Functions
TBA990 **TBA990Q**	Colour demodulator	AU2 AV	As TBA520 but suitable for d.c. drive to picture tube when used with TBA530 and R.G.B. output stages.
TCA270 **TCA270Q**	Synchronous demodulator	AU2 AV	Video amplifier with buffer stage. Noise inverter. A.G.C. detector and output stage for tuners and i.f. amplifiers. A.F.C. demodulator with buffer output stage.

OTHER CIRCUITS

Type No.	Description	Supply Voltage (V)	Input Voltage (V) Low	Input Voltage (V) High	Output Voltage (V) Low	Output Voltage (V) High	Output Impedance (Ω)	Operating Temperature Range (°C)
SAJ110	Bipolar frequency divider (organ circuit)	9	1	6	0·1	7·3	120	−25 to +125

Type No.	Description	Supply Voltage (V)	Drain Current (mA)	Gate Cut-off Current (pA)	Operating Temperature Range (°C)
TAA320A	MOST level sensor	−20	60	1	−20 to +125

Type No.	Description and Construction		Stabilised Voltage (V)	Nom. Operating Current (mA)	Differential Resistance (Ω)	Temperature Coefficient (mV/°C)	Operating Temperature Range (°C)
TAA550	Voltage stabiliser for varicap diodes supply available in 3 voltage groups	AP2	31–32 (red) 32–34 (yellow) 34–35 (green)	5	10	−0·13	−20 to +150

Type No.	Description and Construction		Line Regulation %/V_{out}	Load Regulation %/V_{out}	Short-circuit Current Limit (mA)	Input Voltage Range (V)	Output Voltage Range (V)	Operating Temperature Range (°C)
TBA281	Voltage regulation circuit	AP1	0·1	0·2	65	9·5–40	2–37	0 to +70

Type No.	Description and Construction		V_{CBO} (max.) (V)	Carrier Leakage Power (nW)	f_T (typ.) (MHz)	Operating Temperature Range (°C)	Gain (Typ.) (dB)
TBA673	4-transistor bridge for modulation/demodulation	AP2	+30	3 (typ.)	250	−25 to +100	−0·75

Type No.	Description and Construction		Internal Supply Voltage (nom.) (V)	Output Trigger current (max.) (mA)	Operating Temperature range (°C)	Trigger circuit
TCA280A	Trigger module for Thyristor & Triac control	AU2	12	30	0 to+70	Phase control or zero crossing switch

Type No.	Description and Construction		Line Regulation mV/V_{out}	Load Regulation mV/mA	Short-circuit Current Limit (mA)	Input Voltage Range (V)	Output Voltage Range (V)	Operating Temperature Range (°C)
TCA530	Voltage regulator for use with varicap diodes (adjustable)	AU2	0·2	1·0	4	47—63	30±1	+10 to 60
TCA750	Voltage regulator for use with varicap tuners	AU2	—	—	5·5	27—54	* 21—31 8—18 8—26	+10 to +60

*Voltage adjustable with external components.

Transistors—quick find transistor charts

The three charts which follow are included to enable a quick choice of transistor to be made based on one of three major parameters.

These are the Collector voltage; Total dissipation; Cut-off frequency

The current gain is also quoted in the tables, but fuller data is included in the pages indicated against each type number.

selection by voltage

V_{CB} max. (V)	P_{tot} max. (mW) (T = 25°C)	f_T, f_1 or f_α min. (MHz)	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
8	30	1200	>20	1·0	BFT24	28
20	180	5000 (typ)	25 to 150	10	BFR90	28
	180	5000 (typ)	25 to 150	25	BFR91	28
	500	5000 (typ)	>30	50	BFR96	29
	250	1600 (typ)	>25	50	BFW30	28
	300	350 (typ)	30 to 60	10	BSY38	28
	300	350 (typ)	40 to 120	10	BSY39	28
	300	200	50 to 200	10	BSY95A	28
22	36W	3·0	>50	2A	BD433	30
25	1·0W	5 0 (typ)	100 to 500	300	AC187	27
	1·0W	1·5 (typ)	100 to 500	300	*AC188	26
	350	150 (typ)	†125 to 500	2 0	*BC159	33
	300	150 (typ)	†125 to 500	2·0	*BC559	33
	350	200	>50	10	*BCY72	33
30	140	6·0	>35	200	ASY74	26
	300	300 (typ)	†125 to 900	2·0	BC108	27
	300	300 (typ)	†240 to 900	2·0	BC109	27
	350	300 (typ)	†125 to 900	2·0	BC148	27
	350	300 (typ)	†240 to 900	2·0	BC149	27
	350	150 (typ)	†75 to 500	2·0	*BC158	33
	625	100 (typ)	100 to 600	100	*BC328	34
	625	200 (typ)	100 to 600	100	BC338	29
	300	300 (typ)	†125 to 900	2·0	BC548	27
	300	300 (typ)	†240 to 900	2·0	BC549	27
	300	150 (typ)	† 75 to 500	2 0	*BC558	33
	150	675 (typ)	—	—	BF180	28
	150	500 (typ)	—	—	BF181	28
	220	260 (typ)	115 (typ)	1·0	BF194	28
	220	200 (typ)	67 (typ)	1·0	BF195	28
	150	270	>15	3·0	BF200	27
	250	550 (typ)	—	—	*BF324	33
	3·5W	3500 (typ)	>40	150	BFR94	31
	200	1200	25 to 150	2·0	*BFX89	28
	200	1000	25 to 150	2·0	BFY90	28
32	340	2·5 (typ)	100 (typ)	20	AC127	27
	1·0W	1·5 (typ)	55 to 175	50	*AC128	26
	700	1·0	52 to 180	500	AC176	27
	4·0W	3·0 (typ)	80 to 320	500	AD161	27
	6·0W	1·5 (typ)	80 to 320	500	*AD162	26
	250	0·4	10 to 35	20	*BCY33	33
	250	0·6	15 to 60	20	*BCY34	33
	410	0·45	10 to 30	150	*BCY38	33
	410	0·85	15 to 120	150	*BCY40	33
	36W	3·0	>50	2A	BD435	30
36	103W	550	>20	1·0A	BLW60	31
	88W	300 (typ)	15 to 100	1·4A	BLX14	31
	3·0W	1400 (typ)	>10	100	BLX65	31
	4·0W	1400 (typ)	>10	100	BLX66	31
	4·5W	1400 (typ)	>10	100	BLX67	31
	50W	1000 (typ)	30 (typ)	1·0A	BLX69	31
	8W	1300 (typ)	>10	500	BLY53A	31
	70W	650 (typ)	10 to 120	1·0A	BLY89A	32
	130W	550 (typ)	>10	1·0A	BLY90	32
40	880	80	140 (typ)	150	BCX34	29
	880	100	90 (typ)	150	*BCX37	34
	250	400 (typ)	>27	4·0	BF196	27
	250	550 (typ)	>38	7·0	BF197	27
	250	325 (typ)	—	—	*BF450	33
	250	325 (typ)	—	—	*BF451	33
	800	50	>70	150	BFX86	29
	600	100	>40	10	*BFX88	34
	800	50	>60	150	BFY52	29
	800	50	>30	150	BFY53	29
	21·5W	2000	>20	1·0A	BLX98	31
	5W	250	>10	200	BLY34	31
	12W	250	>10	1·0A	BLY84	32
	10W	250	>10	200	BLY85	32
	360	400	20 to 60	10	BSX19	28
	360	500	40 to 120	10	BSX20	28
	22·5W	0·25 (typ)	15 to 80	1·0A	*OC25	26
	360	500	40 to 120	10	2N2369A	28
	3·5W	700 (typ)	10 to 200	100	2N4427	32
45	350	200	100 to 600	10	*BCY71	33
	11W	80	>40	500	*BD132	34
	6·5W	250 (typ)	40 to 250	150	BD135	29
	6·5W	75 (typ)	40 to 250	150	*BD136	34
45	25W	3·0	>25	1·0A	BD233	30
	25W	3·0	>25	1·0A	*BD234	35
	36W	3·0	>40	2·0A	BD437	30
50	22·5W	0·5 (typ)	30 to 100	1·0A	*AD149	26
	300	300 (typ)	†125 to 500	2·0	BC107	27
	350	300 (typ)	†125 to 500	2·0	BC147	27
	350	150 (typ)	†75 to 260	2·0	*BC157	33
	625	100 (typ)	100 to 600	100	*BC327	34
	625	200 (typ)	100 to 600	100	BC337	29
	300	300 typ()	†125 to 500	2·0	BC547	27
	300	150 (typ)	†75 to 260	2·0	*BC557	33
	410	0·45	12 to 70	150	*BCY54	33
	350	250	>50	10	*BCY70	33
	115W	1·0 (typ)	>30	2A	BDY38	30
	145	230 (typ)	>40	20	BF115	28
	600	100	>40	10	*BFX87	34
55	78W	—	20 to 70	3·0A	BD181	30
	8W	800 (typ)	>10	500	BLY98	32
	22·5W	300 (typ)	20 to 100	1·0A	810BLY/A	32
	5W	700 (typ)	10 to 200	50	2N3866	32
60	3·5W	—	>2000	150	BCX21	37
	880	80	120 (typ)	150	BCX33	29
	880	100	90 (typ)	150	*BCX36	34
	6·5W	250 (typ)	40 to 160	150	BD137	29
	6·5W	75 (typ)	40 to 160	150	*BD138	34
	60W	3·0	>30	3·0A	BD201	30
	60W	3·0	>30	3·0A	*BD202	35
	50W	3·0	>30	2·0A	BD203	30
	60W	3·0	>30	2·0A	*BD204	35
	25W	3·0	>25	1·0A	BD235	30
	25W	3·0	>25	1·0A	*BD236	35
	36W	7·0 (typ)	>750	1·5A	*BD262	37
	55W	2·5 (typ)	>750	3·0A	*BD266	37
	1·25W	—	>1500	500	BDX42	37
	90W	2·5 (typ)	>1000	3·0A	*BDX62	37
	117W	2·5 (typ)	>1000	5·0A	*BDX64	37
	150W	7 (typ)	>1000	10A	*BDX66	31
	600	100	>50	10	*BFX29	34
	360	40	70 to 300	0·01	*BFX37	33
	800	50	>40	150	BFY51	29
	40W	900 (typ)	25 to 80	1·0A	BLW64	31
	8W	800 (typ)	>10	500	BLY98	32
	5W	—	>1500	500	BSS50	37
	30W	0·25 (typ)	45 to 130	1·0A	*OC29	26
	30W	0·25 (typ)	25 to 75	1·0A	*OC35	26
	600	40	20 to 60	150	2N696	29
	600	50	40 to 120	150	2N697	29
	600	200	40 to 120	150	*2N2904	34
	600	200	40 to 120	150	*2N2904A	34
	600	200	100 to 300	150	*2N2905	34
	600	200	100 to 300	150	*2N2905A	34
	400	200	40 to 120	150	*2N2906	34
	400	200	40 to 120	150	*2N2906A	34
	400	200	100 to 300	150	*2N2907	34
	400	200	100 to 300	150	*2N2907A	34
	5·0W	100	50 to 250	150	2N3053	29
	5·0W	—	>1500	500	*BSS60	37
64	250	0·25	10 to 35	20	*BCY30	33
	250	0·25	15 to 60	20	*BCY31	33
	250	0·25	20 to 70	20	*BCY32	33
	410	0·45	10 to 50	150	*BCY39	33
65	600	—	50 to 200	10	*BFX30	34
	70W	500 (typ)	10 to 120	1·0A	BLX13	31
	4W	1200 (typ)	>10	100	BLX91	31
	6W	1200 (typ)	>10	100	BLX92	31
	12·5W	1200 (typ)	>10	100	BLX93	31
	50W	1000 (typ)	10 to 100	1·0A	BLX94	31
	87·5W	1000 (typ)	>15	1·4A	BLX95	31
	5W	250	>10	200	BLY33	31
	12W	250	10 to 220	1·0A	BLY83	32
	70W	500 (typ)	10 to 120	1·0A	BLY93A	32
	130W	500 (typ)	10 to 120	1·0A	BLY94	32
	10W	250	>10	200	BLY97	32
	11·6W	500 (typ)	10 to 100	250	2N3375	32
	7·0W	500 (typ)	10 to 100	250	2N3553	32
	23W	400 (typ)	10 to 150	250	2N3632	32
70	15W	60	35 to 150	500	BD124	30
	11W	60	>40	500	BD131	30

*p-n-p types, V_{CB} max. negative

selection by voltage

V_{CB} max. (V)	P_{tot} max. (mW) (T = 25°C)	f_T, f_1 or fo min. (MHz)	h_{FE} at I_C (mA)		Type No.	Page No.
			†h_{fe}			
70	117W	—	20 to 70	4·0A	**BD182**	30
	800	250	>25	500	**BSX59**	30
	800	250	>30	500	**BSX61**	30
75	800	60 (typ)	40 to 120	150	**2N1613**	29
	800	70	100 to 300	150	**2N1711**	29
80	880	80	110 (typ)	150	**BCX32**	29
	880	100	90 (typ)	150	***BCX35**	34
	36W	7·0 (typ)	>750	1·5A	***BD262A**	37
	36W	7·0 (typ)	>750	1·5A	**BD263**	37
	55W	2·5 (typ)	>750	3·0A	***BD266A**	37
	55W	2·5 (typ)	>750	3·0A	**BD267**	37
	1·25W	—	>1500	500	**BDX43**	37
	90W	7·0 (typ)	>1000	3·0A	***BDX62A**	37
	90W	7·0 (typ)	>1000	3·0A	**BDX63**	37
	117W	2·5 (typ)	>1000	5·0A	***BDX64A**	37
	117W	2·5 (typ)	>1000	5·0A	**BDX65**	37
	150W	7 (typ)	>1000	10A	***BDX66A**	37
	150W	7 (typ)	>1000	10A	**BDX67**	37
	55W	3·0	>30	2·0A	**BDX77**	30
	55W	3·0	>30	2·0A	***BDX78**	35
	40W	70 (typ)	30 to 120	5·0A	**BDY92**	30
	800	60	>30	150	**BFY50**	29
	5W	—	>1500	500	**BSS51**	37
	30W	0·25 (typ)	20 to 55	1·0A	***OC28**	26
	30W	0·25 (typ)	30 to 110	1·0A	***OC36**	26
	800	60	40 to 120	150	**2N2297**	29
	5·0W	—	>1500	500	***BSS61**	37
85	117W	—	20 to 70	3·0A	**BD183**	30
	88W	250 (typ)	15 to 100	1·4A	**BLX14**	31
90	11W	60	>40	500	**BD133**	30
95	117W	—	20 to 70	4·0A	**BD184**	30
100	880	80	100 (typ)	150	**BCX31**	29
	6·5W	250 (typ)	40 to 160	150	**BD139**	29
	6·5W	75 (typ)	40 to 160	150	***BD140**	34
	25W	3·0	>25	1·0A	**BD237**	30
	25W	3·0	>25	1·0A	***BD238**	35
	36W	7·0 (typ)	>750	1·5A	**BD262B**	37
	36W	7·0 (typ)	>750	1·5A	**BD263A**	37
	55W	2·5 (typ)	>750	3·0A	**BD267A**	37
	15W	100	45 to 450	500	**BDX35**	31
	1·25W	—	>1500	500	**BDX44**	37
	90W	7·0 (typ)	>1000	3·0A	**BDX62B**	37
	90W	7·0 (typ)	>1000	3·0A	***BDX83A**	37
	117W	2·5 (typ)	>1000	5·0A	**BDX65A**	37
	150W	7 (typ)	>1000	10A	**BDX67A**	37
	115W	1·0	20 to 70	4·0A	**BDY20**	30
	40W	70 (typ)	30 to 120	5·0A	**BDY91**	30
	800	50	>30	150	**BFX84**	29
	800	50	>70	150	**BFX85**	29
	5W	—	>1500	500	**BSS52**	37
	870	100 (typ)	>40	2·0A	**BSV64**	30
	800	80 (typ)	>40	100	**BSW66**	30
	30W	0·25 (typ)	25 to 75	1·0A	***OC20**	26
	115W	0·8	20 to 70	4·0A	**2N3055**	30
110	195W	275 (typ)	10 to 70	1·4A	**BLX15**	31
	300	50	>30	25	***BSS68**	33
	250	50	>30	25	***BSV68**	33
120	36W	7·0 (typ)	>750	1·5A	**BD263B**	37
	15W	100	45 to 450	500	**BDX36**	31
	15W	100	45 to 450	500	**BDX37**	31
	90W	7·0 (typ)	>1000	3·0A	**BDX63B**	37
	40W	70 (typ)	30 to 120	5·0A	**BDY90**	30
	300	60	>20	1·0	**BSS38**	28
	800	80 (typ)	>40	100	**BSW67**	30
	300	60	>20	4·0	**BSX21**	28
140	100W	1·0 (typ)	20 to 70	2·0A	**2N4347**	30
150	800	80 (typ)	>40	100	**BSW68**	30
160	117W	1·0 (typ)	20 to 70	3·0A	**2N3442**	30
185	3·0W	80	>20	30	**BF336**	29
200	50W	100 (typ)	>50	1·0A	**BUY86**	31

*p-n-p types, V_{CB} max. negative

V_{CB} max. (V)	P_{tot} max (mW) (T = 25°C)	f_T, f_1 or fα min. (MHz)	h_{FE} at I_C (mA)		Type No.	Page No.
			†h_{fe}			
250	10W	—	—	—	**BD160**	30
	3·0W	80	>20	30	**BF337**	29
	5·0W	60 (typ)	>50	10	***BFT45**	34
300	3·0W	80	>20	30	**BF338**	29
	3·0W	130 (typ)	70 (typ)	100	**BF355**	29
	5·0W	60 (typ)	>50	10	***BFT44**	34
	50W	100 (typ)	>50	1·0A	**BUY87**	31
500	7·0W	15 (typ)	25 to 175	50	**BD232**	29
600	30W	12 (typ)	15 to 60	1·0A	**BDY95**	30
	40W	10 (typ)	15 to 60	2·0A	**BDY98**	30
750	30W	12 (typ)	15 to 60	1·0A	**BDY93**	30
	30W	12 (typ)	15 to 60	1·0A	**BDY94**	30
	40W	10 (typ)	15 to 60	2·0A	**BDY96**	30
	40W	10 (typ)	15 to 60	2·0A	**BDY97**	30
	30W	8·0 (typ)	15 to 60	1·0A	**BU126**	31
	30W	8·0 (typ)	15 to 80	1·0A	**BU133**	31
1300	10W	7·5 (typ)	>2	2·0A	**BU204**	31
	12·5W	7·0 (typ)	>2·25	4·5A	**BU207**	31
1500	10W	7·5 (typ)	>2	2·0A	**BU205**	31
	12·5W	7·0 (typ)	>2·25	3·0A	**BU208**	31
1700	10W	7·5 (typ)	>1·8	2·0A	**BU208**	31
	12·5W	7·0 (typ)	>2·25	3·0A	**BU209**	31

Transistors

selection by total dissipation

P_{tot} max. ($T = 25°C$)	V_{CB} max. (V)	f_T, f_1 or $f\alpha$ (MHz) min.	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
30mW	+8	1200	>20	1·0	BFT24	28
120mW	+30	800 (typ)	>20	3·0	BF362	28
	+30	600	>20	3·0	BF363	28
130mW	+36	550 (typ)	>10	1·0A	BLY90	32
140mW	+30	6·0	>35	200	ASY74	26
145mW	+50	230 (typ)	>40	20	BF115	28
150mW	+30	675 (typ)	—	—	BF180	28
	+30	600 (typ)	—	—	BF181	28
	+30	270	>15	3·0	BF200	27
180mW	+20	5000 (typ)	25 to 150	10	BFR90	28
	+20	5000 (typ)	25 to 150	25	BFR91	28
200mW	+30	1200	25 to 150	2·0	BFX89	28
	+30	1000	25 to 125	2·0	BFY90	28
220mW	+30	260 (typ)	115 (typ)	1·0	BF194	28
	+30	200 (typ)	67 (typ)	1·0	BF195	28
250mW	−64	0·25	10 to 35	20	*BCY30	33
	−64	0·25	15 to 60	20	*BCY31	33
	−64	0·25	20 to 70	20	*BCY32	33
	−32	0·4	10 to 35	20	*BCY33	33
	−32	0·6	15 to 60	20	*BCY34	33
	+40	400 (typ)	>27	4·0	BF196	27
	+40	550 (typ)	>38	7·0	BF197	27
	−30	550 (typ)	—	—	*BF324	33
	−40	325 (typ)	—	—	*BF450	33
	−40	325 (typ)	—	—	*BF451	33
	+20	1600 (typ)	>25	50	BFW30	28
	−110	50	>30	25	*BSV68	33
300mW	+50	300 (typ)	†125 to 500	2·0	BC107	27
	+30	300 (typ)	†125 to 900	2·0	BC108	27
	+30	300 (typ)	†240 to 900	2·0	BC109	27
	+50	300 (typ)	†125 to 500	2·0	BC547	27
	+30	300 (typ)	†125 to 900	2·0	BC548	27
	+30	300 (typ)	†240 to 900	2·0	BC549	27
	−50	150 (typ)	†75 to 260	2·0	*BC557	33
	−30	150 (typ)	†75 to 500	2·0	*BC558	33
	−25	150 (typ)	†125 to 500	2·0	*BC559	33
	+120	60	>20	1·0	BSS38	28
	−110	50	>30	25	*BSS68	33
	+120	60	>20	4·0	BSX21	28
	+20	350 (typ)	30 to 60	10	BSY38	28
	+20	350 (typ)	40 to 120	10	BSY39	28
	+20	200	50 to 200	10	BSY95A	28
340mW	+32	2·5 (typ)	100 (typ)	20	AC127	27
350mW	+50	300 (typ)	†125 to 500	2·0	BC147	27
	+30	300 (typ)	†125 to 900	2·0	BC148	27
	+30	300 (typ)	†240 to 900	2·0	BC149	27
	−50	150 (typ)	†75 to 260	2·0	*BC157	33
	−30	150 (typ)	†75 to 500	2·0	*BC158	33
	−25	150 (typ)	†125 to 500	2·0	*BC159	33
	−50	250	>50	10	*BCY70	33
	−45	200	100 to 600	10	*BCY71	33
	−25	200	>50	10	*BCY72	33
360mW	−60	40	70 to 300	0·01	*BFX37	33
	+40	400	20 to 60	10	BSX19	28
	+40	500	40 to 120	10	BSX20	28
	+40	500	40 to 120	10	2N2369A	28
400mW	−60	200	40 to 120	150	*2N2906	34
	−60	200	40 to 120	150	*2N2906A	34
	−60	200	100 to 300	150	*2N2907	34
	−60	200	100 to 300	150	*2N2907A	34
410mW	−32	0·45	10 to 30	150	*BCY38	33
	−64	0·45	10 to 50	150	*BCY39	33
	−32	0·85	15 to 120	150	*BCY40	33
	−50	0·45	12 to 70	150	*BCY54	33
500mW	+20	5000 (typ)	>30	50	BFR96	29
600mW	−60	100	>50	10	*BFX29	34
	−65	—	50 to 200	10	*BFX30	34

P_{tot} max. ($T = 25°C$)	V_{CB} max. (V)	f_T, f_1 or $f\alpha$ (MHz) min.	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
600mW	−50	100	>40	10	*BFX87	34
	−40	100	>40	10	*BFX88	34
	+60	40	20 to 60	150	2N696	29
	+60	50	40 to 120	150	2N697	29
	−60	200	40 to 120	150	*2N2904	34
	−60	200	40 to 120	150	*2N2904A	34
	−60	200	100 to 300	150	*2N2905	34
	−60	200	100 to 300	150	*2N2905A	34
625mW	−50	100 (typ)	100 to 600	100	*BC327	34
	−30	100 (typ)	100 to 600	100	*BC328	34
	+50	200 (typ)	100 to 600	100	BC337	29
	+30	200 (typ)	100 to 600	100	BC338	29
700mW	+32	1·0	52 to 180	500	AC176	27
800mW	+100	50	>30	150	BFX84	29
	+100	50	>70	150	BFX85	29
	+40	50	>70	150	BFX86	29
	+80	60	>30	150	BFY50	29
	+60	50	>40	150	BFY51	29
	+40	50	>60	150	BFY52	29
	+40	50	>30	150	BFY53	29
	+100	80 (typ)	>40	100	BSW66	30
	+120	80 (typ)	>40	100	BSW67	30
	+150	80 (typ)	>40	100	BSW68	30
	+70	250	>25	500	BSX59	30
	+70	250	>30	500	BSX61	30
	+75	60 (typ)	40 to 120	150	2N1613	29
	+75	70	100 to 300	150	2N1711	29
	+80	60	40 to 120	150	2N2297	29
870mW	+100	100 (typ)	>40	2A	BSV64	30
880mW	+100	80	100 (typ)	150	BCX31	29
	+80	80	110 (typ)	150	BCX32	29
	+60	80	120 (typ)	150	BCX33	29
	+40	80	140 (typ)	150	BCX34	29
	−80	100	90 (typ)	150	*BCX35	34
	−60	100	90 (typ)	150	*BCX36	34
	−40	100	90 (typ)	150	*BCX37	34
1·0W	−32	1·5 (typ)	55 to 175	50	*AC128	26
	+25	5·0 (typ)	100 to 500	300	AC187	27
	−25	1·5 (typ)	100 to 500	300	*AC188	26
1·25W	+60	—	>1500	500	BDX42	37
	+80	—	>1500	500	BDX43	37
	+100	—	>1500	500	BDX44	37
1·5W	+40	1200 (typ)	>25	150	BFW16A	31
	+40	1100 (typ)	>25	150	BFW17A	31
3·0W	+185	80	>20	30	BF336	29
	+250	80	>20	30	BF337	29
	+300	80	>20	30	BF338	29
	+300	130 (typ)	70 (typ)	100	BF355	29
	+36	1400 (typ)	>10	100	BLX65	31
3·5W	+60	—	>2000	150	BCX21	37
	+30	3500 (typ)	>40	150	BFR94	31
	+40	700 (typ)	10 to 200	100	2N4427	32
4·0W	+32	3·0 (typ)	80 to 320	500	AD161	27
	+36	1400 (typ)	>10	100	BLX66	31
	+65	1200 (typ)	>10	100	BLX91	31
4·5W	+36	1400 (typ)	>10	100	BLX67	31
5·0W	−300	60 (typ)	>50	10	*BFT44	34
	−250	60 (typ)	>50	10	*BFT45	34
	+65	250	>10	200	BLY33	31
	+40	250	>10	200	BLY34	31
	+60	—	>1500	500	BSS50	37
	+80	—	>1500	500	BSS51	37
	+100	—	>1500	500	BSS52	37
	−60	—	>1500	500	*BSS60	37
	−80	—	>1500	500	*BSS61	37
	+60	100	50 to 250	150	2N3053	29
	+55	700 (typ)	110 to 200	50	2N3866	32
6·0W	−32	1·5 (typ)	80 to 320	500	*AD162	26
	+65	1200 (typ)	>10	100	BLX92	31

*p-n-p types, V_{CB} max. negative

selection by total dissipation

P_{tot} max. ($T = 25°C$)	V_{CB} max. (V)	f_T, f_1 or fo (MHz) min.	h_{FE} at I_C (mA)	†h_{fe}	Type No.	Page No.
6·5W	+45	250 (typ)	40 to 250	150	**BD135**	29
	−45	75 (typ)	40 to 250	150	***BD136**	34
	+60	250 (typ)	40 to 160	150	**BD137**	29
	−60	75 (typ)	40 to 160	150	***BD138**	34
	+100	250 (typ)	40 to 160	150	**BD139**	29
	−100	75 (typ)	40 to 160	150	***BD140**	34
7·0W	+500	15 (typ)	25 to 175	50	**BD232**	29
	+65	500 (typ)	10 to 100	250	**2N3553**	32
8W	+36	1300 (typ)	>10	500	**BLY53A**	31
	+55	800 (typ)	>10	500	**BLY98**	32
10W	+250	—	—	—	**BD160**	30
	+40	250	>10	200	**BLY85**	32
	+66	250	>10	200	**BLY97**	32
	+1300	7·5 (typ)	>2	2·0A	**BU204**	31
	+1500	7·5 (typ)	>2	2·0A	**BU205**	31
	+1700	7·5 (typ)	>1·8	2·0A	**BU206**	31
11W	+70	60	>40	500	**BD131**	30
	−45	60	>40	500	***BD132**	34
	+90	60	>40	500	**BD133**	30
11·6W	+65	500 (typ)	10 to 100	250	**2N3375**	32
12W	+65	250	10 to 220	1·0A	**BLY83**	32
	+40	250	>10	1·0A	**BLY84**	32
12·5W	+65	1200 (typ)	>10	100	**BLX93**	31
	+1300	7·0 (typ)	>2·25	4·5A	**BU207**	31
	+1500	7·0 (typ)	>2·25	4·5A	**BU208**	31
	+1700	7·0 (typ)	>2·25	3·0A	**BU209**	31
15W	+70	60	35 to 150	500	**BD124**	30
	+100	100	45 to 450	500	**BDX35**	31
	+120	100	45 to 450	500	**BDX36**	31
	+120	100	45 to 450	500	**BDX37**	31
20W	+65	300 (typ)	>5	500	**BLY93A**	32
21·5W	+40	2000	>20	1·0A	**BLX98**	31
22·5W	−50	0·5 (typ)	30 to 100	1·0A	***AD149**	26
	−40	—	15 to 80	1·0A	***OC25**	26
	+55	300 (typ)	20 to 100	1·0A	**810BLY/A**	32
23 W	+65	400 (typ)	10 to 150	250	**2N3632**	32
25W	+45	3·0	>25	1·0A	**BD233**	30
	−45	3·0	>25	1·0A	***BD234**	35
	+60	3·0	>25	1·0A	**BD235**	30
	−60	3·0	>25	1·0A	***BD236**	35
	+100	3·0	>25	1·0A	**BD237**	30
	−100	3·0	>25	1·0A	***BD238**	35
30W	+750	12 (typ)	15 to 60	1·0A	**BDY93**	30
	+750	12 (typ)	15 to 60	1·0A	**BDY94**	30
	+600	12 (typ)	15 to 60	1·0A	**BDY95**	30
	+750	8·0 (typ)	15 to 60	1·0A	**BU126**	31
	+750	8·0 (typ)	15 to 80	1·0A	**BU133**	31
	−100	0·25 (typ)	25 to 75	1·0A	***OC20**	26
	−80	0·25 (typ)	20 to 55	1·0A	***OC28**	26
	−60	0·25 (typ)	45 to 130	1·0A	***OC29**	26
	−60	0·25 (typ)	25 to 75	1·0A	***OC35**	26
	−80	0·25 (typ)	30 to 110	1·0A	***OC36**	26
36W	−60	7·0 (typ)	>750	1·5A	***BD262**	37
	−80	7·0 (typ)	>750	1·5A	***BD262A**	37
	−100	7·0 (typ)	>750	1·5A	***BD262B**	37
	+80	7·0 (typ)	>750	1·5A	**BD263**	37
	+100	7·0 (typ)	>750	1·5A	**BD263A**	37
	+120	7·0 (typ)	>750	1·5A	**BD263B**	37
	+22	3·0	>50	2·0A	**BD433**	30
	+32	3·0	>50	2·0A	**BD435**	30
	+45	3·0	>40	2·0A	**BD437**	30
40W	+120	70 (typ)	30 to 120	5·0A	**BDY90**	30
	+100	70 (typ)	30 to 120	5·0A	**BDY91**	30
	+80	70 (typ)	30 to 120	5·0A	**BDY92**	30
	+750	10 (typ)	15 to 60	2·0A	**BDY96**	30
	+600	10 (typ)	15 to 60	2·0A	**BDY97**	30
	+750	10 (typ)	15 to 60	2·0A	**BDY98**	30
	+60	900 (typ)	25 to 80	1·0A	**BLW64**	31

P_{tot} max. ($T = 25°C$)	V_{CB} max. (V)	f_T f_1 or fo (MHz) min.	h_{FE} at I_C (mA)	†h_{fe}	Type No.	Page No.
50W	+36	1000 (typ)	30 (typ)	1·0A	**BLX69**	31
	+65	1000 (typ)	10 to 100	1·0A	**BLX94**	31
	+200	100 (typ)	>50	1·0A	**BUY86**	31
	+300	100 (typ)	>50	1·0A	**BUY87**	31
55W	−60	2·5 (typ)	>750	3·0A	***BD266**	37
	−80	2·5 (typ)	>750	3·0A	***BD266A**	37
	+80	2·5 (typ)	>750	2·0A	**BD267**	37
	+100	2·5 (typ)	>750	2·0A	**BD267A**	37
	+80	3·0	>30	2·0A	**BDX77**	30
	−80	3·0	>30	2·0A	***BDX78**	35
60W	+60	3·0	>30	3·0A	**BD201**	30
	−60	3·0	>30	3·0A	***BD202**	35
	+60	3·0	>30	2·0A	**BD203**	30
	−60	3·0	>30	2·0A	***BD204**	35
70W	+65	500 (typ)	15 to 100	1·4A	**BLX13**	31
	+36	650 (typ)	10 to 120	1·0A	**BLY89A**	32
	+65	500 (typ)	10 to 120	1·0A	**BLY93A**	32
78W	+55	—	20 to 70	3·0A	**BD181**	30
88W	+140	300 (typ)	15 to 100	1·4A	**BLX14**	31
	+65	1200 (typ)	>15	1·6A	**BLX95**	31
90W	−60	7·0 (typ)	>1000	3·0A	***BDX62**	37
	−80	7·0 (typ)	>1000	3·0A	***BDX62A**	37
	−100	7·0 (typ)	>1000	3·0A	***BDX62B**	37
	+80	7·0 (typ)	>1000	3·0A	**BDX63**	37
	+100	7·0 (typ)	>1000	3·0A	**BDX63A**	37
	+120	7·0 (typ)	>1000	3·0A	**BDX63B**	37
100W	+36	550	>20	1·0A	**BLW60**	31
	+36	1·0 (typ)	20 to 70	2·0A	**2N4347**	30
115W	+100	1·0	20 to 70	4·0A	**BDY20**	30
	+50	1·0 (typ)	>30	2·0A	**BDY38**	30
	+100	0·8	20 to 70	4·0A	**2N3055**	30
117W	+70	—	20 to 70	4·0A	**BD182**	30
	+85	—	20 to 70	3·0A	**BD183**	30
	+95	—	20 to 70	4·0A	**BD184**	30
	−60	2·5 (typ)	>1000	5·0A	***BDX64**	37
	−80	2·5 (typ)	>1000	5·0A	***BDX64A**	37
	+80	2·5 (typ)	>1000	5·0A	**BDX65**	37
	+100	2·5 (typ)	>1000	5·0A	**BDX65A**	37
	+160	1·0 (typ)	20 to 70	3·0A	**2N3442**	30
130W	+36	550 (typ)	>10	1·0A	**BLY90**	32
	+65	500 (typ)	10 to 120	1·0A	**BLY94**	32
150W	−60	7 (typ)	>1000	10A	***BDX66**	37
	−80	7 (typ)	>1000	10A	***BDX66A**	37
	+80	7 (typ)	>1000	10A	**BDX67**	37
	+100	7 (typ)	>1000	10A	**BDX67A**	37
195W	+110	275 (typ)	10 to 70	1·4A	**BLX15**	31

*p-n-p types. V_{CB} max. negative

Transistors

selection by cut-off frequency

f_T, f_1 or fo (MHz) min.	P_{tot} max. (mW) T = 25°C	V_{CB} max. (V)	h_{FE} et I_C (mA) †h_{fe}		Type No.	Page No.
0·25	250	−64	10 to 35	20	*BCY30	33
	250	−64	15 to 60	20	*BCY31	33
	250	−64	20 to 70	20	*BCY32	33
	30W	−100	25 to 75	1·0A	*OC20	26
	22·5W	−40	15 to 80	1·0A	*OC25	26
	30W	−80	20 to 55	1·0A	*OC28	26
	30W	−60	45 to 130	1·0A	*OC29	26
	30W	−60	25 to 75	1·0A	*OC35	26
	30W	−80	30 to 110	1·0A	*OC36	26
0·4	250	−32	10 to 35	20	*BCY33	33
0·45	410	−32	10 to 30	150	*BCY38	33
	410	−64	10 to 50	150	*BCY39	33
	410	−50	12 to 70	150	*BCY54	33
0·5 (typ)	22·5W	−50	30 to 100	1·0A	*AD149	26
0·8	250	−32	15 to 60	20	*BCY34	33
0·8	115W	−100	20 to 70	4·0A	*2N3055	30
0·85	410	−32	15 to 120	150	*BCY40	33
1·0 (typ)	117W	+160	20 to 70	3·0A	2N3442	30
	100W	+140	20 to 70	2·0A	2N4347	30
1·0	700	+32	52 to 180	500	AC176	27
	115W	+100	20 to 70	4A	BDY20	30
	115W	+50	>30	2A	BDY38	30
1·5 (typ)	1·0W	−32	55 to 175	50	*AC128	26
	1·0W	−25	100 to 500	300	*AC188	26
	6·0W	−32	80 to 320	500	*AD182	26
2·5 (typ)	340	+32	100 (typ)	20	AC127	27
	55W	−60	>750	3·0A	*BD266	37
	55W	−80	>750	3·0A	*BD266A	37
	55W	+80	>750	3·0A	BD267	37
	55W	+100	>750	3·0A	BD267A	37
	117W	−60	>1000	5·0A	*BDX64	37
	117W	−80	>1000	5·0A	*BDX84A	37
	117W	+80	>1000	5·0A	BDX65	37
	117W	+100	>1000	5·0A	BDX85A	37
3·0 (typ)	4·0W	+32	80 to 320	500	AD161	27
3·0	60W	+60	>30	3·0A	BD201	30
	60W	−60	>30	3·0A	*BD202	35
	60W	+60	>30	2·0A	BD203	30
	60W	−60	>30	2·0A	*BD204	35
	25W	+45	>25	1·0A	BD233	30
	25W	−45	>25	1·0A	*BD234	35
	25W	+60	>25	1·0A	BD235	30
	25W	−60	>25	1·0A	*BD236	35
	25W	+100	>25	1·0A	BD237	30
	25W	−100	>25	1·0A	*BD238	35
	36W	+22	>50	2·0A	BD433	30
	36W	+32	>50	2·0A	BD435	30
	36W	+45	>40	2·0A	BD437	30
	55W	+80	>30	2·0A	BDX77	30
	55W	−80	>30	2·0A	*BDX78	35
5·0 (typ)	1·0W	+25	100 to 500	300	AC187	27
6·0	140	+30	>35	200	ASY74	26
7·0 (typ)	36W	−60	>750	1·5A	*BD262	37
	36W	−80	>750	1·5A	*BD262A	37
	36W	−100	>750	1·5A	*BD262B	37
	36W	+80	>750	1·5A	BD263	37
	36W	+100	>750	1·5A	BD263A	37
	36W	+120	>750	1·5A	BD263B	37
	90W	−60	>1000	3·0A	*BDX62	37
	90W	−80	>1000	3·0A	*BDX82A	37
	90W	−100	>1000	3·0A	*BDX82B	37
	90W	+80	>1000	3·0A	BDX63	37
	90W	+100	>1000	3·0A	BDX83A	37
	90W	+120	>1000	3·0A	BDX63B	37
	150W	−60	>1000	10A	*BDX66	37
	150W	−80	>1000	10A	*BDX86A	37
	150W	+80	>1000	10A	BDX67	37
	150W	+100	>1000	10A	BDX67A	37
	12·5W	+1300	>2·25	4·5A	BU207	31
7·0 (typ)	12·5W	+1500	>2·25	4·5A	BU208	31
	12·5W	+1700	>2·25	3·0A	BU209	31
7·5 (typ)	10W	+1300	>2	2·0A	BU204	31
	10W	+1500	>2	2·0A	BU205	31
	10W	+1700	>1·8	2·0A	BU206	31
8·0 (typ)	30W	+750	15 to 60	1·0A	BU126	31
	30W	+750	15 to 80	1·0A	BU133	31
10 (typ)	40W	+750	15 to 60	2·0A	BDY98	30
	40W	+750	15 to 60	2·0A	BDY97	30
	40W	+600	15 to 60	2·0A	BDY98	30
12 (typ)	30W	+750	15 to 60	1·0A	BDY93	30
	30W	+750	15 to 60	1·0A	BDY94	30
	30W	+600	15 to 60	1·0A	BDY95	30
15 (typ)	7·0W	+500	25 to 175	50	BD232	29
40	360	−60	70 to 300	0·01	*BFX37	33
	600	+60	20 to 60	150	2N696	29
50	800	+100	>30	150	BFX84	29
	800	+100	>70	150	BFX85	29
	800	+40	>70	150	BFX86	29
	800	+60	>40	150	BFY51	29
	800	+40	>60	150	BFY52	29
	800	+40	>30	150	BFY53	29
	300	−110	>30	25	*BSS68	33
	250	−110	>30	25	*BSV68	33
	600	+60	40 to 120	150	2N697	29
60 (typ)	5·0W	−300	>50	10	*BFT44	34
	5·0W	−250	>50	10	*BFT45	34
60	15W	+70	35 to 150	500	BD124	30
	11W	+70	>40	500	BD131	30
	11W	−45	>40	500	*BD132	34
	11W	+90	>40	500	BD133	30
	800	+80	>30	150	BFY50	29
	300	+120	>20	1·0	BSS38	28
	300	+120	>20	4·0	BSX21	28
	800	+75	40 to 120	150	2N1613	29
	800	+80	40 to 120	150	2N2297	29
70 (typ)	40W	+120	30 to 120	5·0A	BDY90	30
	40W	+100	30 to 120	5·0A	BDY91	30
	40W	+80	30 to 120	5·0A	BDY92	30
70	800	+75	100 to 300	150	2N1711	29
75 (typ)	6·5W	−45	40 to 250	150	*BD136	34
	6·5W	−60	40 to 160	150	*BD138	34
	6·5W	−100	40 to 160	150	*BD140	34
80 (typ)	800	+100	>40	100	BSW66	30
	800	+120	>40	100	BSW67	30
	800	+150	>40	100	BSW68	30
80	880	+100	100 (typ)	150	BCX31	29
	880	+80	110 (typ)	150	BCX32	29
	880	+60	120 (typ)	150	BCX33	29
	880	+40	140 (typ)	150	BCX34	29
	3·0W	+185	>20	30	BF336	29
	3·0W	+250	>20	30	BF337	29
	3·0W	+300	>20	30	BF338	29
100 (typ)	625	−50	100 to 600	100	*BC327	34
	625	−30	100 to 600	100	*BC328	34
	870	+100	>40	2A	BSV64	30
	50W	+200	>50	1·0A	BUY86	31
	50W	+300	>50	1·0A	BUY87	31
100	880	−80	90 (typ)	150	*BCX35	34
	880	−60	90 (typ)	150	*BCX36	34
	880	−40	90 (typ)	150	*BCX37	34
	15W	+100	45 to 450	500	BDX35	31
	15W	+120	45 to 450	500	BDX36	31
	15W	+120	45 to 450	500	BDX37	31
	500	−60	>50	10	*BFX29	34
	600	−50	>40	10	*BFX87	34
	600	−40	>40	10	*BFX88	34
	5·0W	+60	50 to 250	150	2N3053	29

*p-n-p types, V_{CB} mex. negative

selection by cut-off frequency

f_T, f_1 or fα (MHz) min.	P_{tot} max. (mW) T = 25°C	V_{CB} max. (V)	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
130 (typ)	3·0W	+300	70 (typ)	100	BF355	29
150 (typ)	350	−50	†75 to 260	2·0	*BC157	33
	350	−30	†75 to 500	2·0	*BC158	33
	350	−25	†125 to 500	2·0	*BC159	33
	300	−50	†75 to 260	2·0	*BC557	33
	300	−30	†75 to 500	2·0	*BC558	33
	300	−25	†125 to 500	2·0	*BC559	33
200 (typ)	625	+50	100 to 600	100	BC337	29
	625	+30	100 to 600	100	BC338	29
	220	+30	115 (typ)	1·0	BF195	28
200	350	−45	100 to 600	10	*BCY71	33
	350	−25	>50	10	*BCY72	33
	300	+20	50 to 200	10	BSY95A	28
	600	−60	40 to 120	150	*2N2904	34
	600	−60	40 to 120	150	*2N2904A	34
	600	−60	100 to 300	150	*2N2905	34
	600	−60	100 to 300	150	*2N2905A	34
	400	−60	40 to 120	150	*2N2906	34
	400	−60	40 to 120	150	*2N2906A	34
	400	−60	100 to 300	150	*2N2907	34
	400	−60	100 to 300	150	*2N2907A	34
230 (typ)	140	+50	>40	20	BF115	28
250 (typ)	6·5W	+45	40 to 250	150	BD135	29
	6·5W	+60	40 to 160	150	BD137	29
	6·5W	+100	40 to 160	150	BD139	29
	88W	+85	15 to 100	1·4A	BLX14	31
250	350	−50	>50	10	*BCY70	33
	5W	+65	>10	200	BLY33	31
	5W	+40	>10	200	BLY34	31
	12W	+65	>10	1·0A	BLY83	32
	12W	+40	>10	1·0A	BLY84	32
	10W	+40	>10	200	BLY85	32
	10W	+66	>10	200	BLY97	32
	800	+70	>25	500	BSX59	30
	800	+70	>30	500	BSX61	30
260 (typ)	220	+30	115 (typ)	1·0	BF194	28
270	150	+30	>15	3·0	BF200	27
275 (typ)	195W	+110	10 to 70	1·4A	BLX15	31
300 (typ)	300	+50	†125 to 500	2·0	BC107	27
	300	+30	†125 to 900	2·0	BC108	27
	300	+30	†240 to 900	2·0	BC109	27
	350	+50	†125 to 500	2·0	BC147	27
	350	+30	†125 to 900	2·0	BC148	27
	350	+30	†240 to 900	2·0	BC149	27
	300	+50	†125 to 500	2·0	BC547	27
	300	+30	†125 to 900	2·0	BC548	27
	300	+30	†240 to 900	2·0	BC549	27
	20W	+65	>5	500	BLY93A	32
	22·5W	+55	20 to 100	1·0A	810BLY/A	32
325 (typ)	250	−40	—	—	*BF450	33
	250	−40	—	—	*BF451	33
350 (typ)	300	+20	30 to 60	10	BSY38	28
	300	+20	40 to 120	10	BSY39	28
400 (typ)	250	+40	>27	4·0	BF196	27
	23W	+65	10 to 150	250	2N3632	32
400	360	+40	20 to 60	10	BSX19	28
500 (typ)	11·6W	+65	10 to 100	250	2N3375	32
	7·0W	+65	10 to 100	250	2N3553	32
	70W	+65	10 to 120	1·0A	BLX13	31
	70W	+65	10 to 120	1·0A	BLY93A	32
	130W	+65	10 to 120	1·0A	BLY94	32
500	360	+40	40 to 120	10	BSX20	28
	360	+40	40 to 120	10	2N2369A	28
550 (typ)	250	+40	>38	7·0	BF197	27
	250	−30	—	—	*BF324	33
	130W	+36	>10	1·0A	BLY90	32

*p-n-p types, V_{CB} max. negative

f_T, f_1 or fo (MHz) min.	P_{tot} max. (mW) T = 25°C	V_{CB} max. (V)	h_{FE} at I_C (mA) †h_{fe}		Type No.	Page No.
550	103W	+36	>20	1·0A	BLW60	31
600 (typ)	150	+30	—	—	BF181	28
600	120	+30	>20	3·0	BF363	28
650 (typ)	70W	+36	10 to 120	1·0A	BLY89A	32
675 (typ)	150	+30	—	—	BF180	28
700 (typ)	5W	+55	10 to 200	50	2N3866	32
	3·5W	+40	10 to 200	100	2N4427	32
800 (typ)	120	+30	>20	3·0	BF362	28
	8W	+55	>10	500	BLY98	32
900 (typ)	40W	+60	25 to 80	1·0A	BLW64	31
1000 (typ)	50W	+36	30 (typ)	1·0A	BLX69	31
	50W	+65	10 to 100	1·0A	BLX94	31
	87·5W	+65	>15	1·4A	BLX95	31
1200 (typ)	30	+8	>20	1·0	BFT24	28
	1·5W	+40	>25	150	BFW16A	31
	200	+30	25 to 150	2·0	BFX89	28
	4W	+65	>10	100	BLX91	31
	6W	+65	>10	100	BLX92	31
	12·5W	+65	>10	100	BLX93	31
1300 (typ)	8W	+36	>10	500	BLY53A	31
1400 (typ)	3W	+36	>10	100	BLX65	31
	4·0W	+36	>10	100	BLX66	31
	4·5W	+36	>10	100	BLX67	31
1600 (typ)	250	+20	>25	50	BFW30	28
2000	21·5W	+40	>20	1·0A	BLX98	31
3500 (typ)	3·5W	+30	>40	150	BFR94	31
5000 (typ)	180	+20	25 to 150	10	BFR90	28
	180	+20	25 to 150	25	BFR91	28
	500	+20	>30	50	BFR96	29

Transistors

germanium p-n-p medium power transistors

book 1 parts 1 and 2

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T typ (MHz)	Special Features
GENERAL PURPOSE													
AC128	K	A	−32	−16	2000	1000	90	1000	55	175	50	1·5	Complementary to AC127
AC188	K	A	−25	−15	2000	1000	90	1000	100	500	300	1·5	Complementary to AC187

germanium p-n-p high power transistors

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T_j (°C)	P_{tot} T_{mb}45°C (W)	h_{FE} min.	h_{FE} max.	at I_C (A)	f_T typ (MHz)	Special Features
GENERAL PURPOSE													
†**AD149**	F1	A	−50	−30	3·5	3·5	100	22·5	30	100	1·0	0·5	
AD162	F3	A	−32	−20	3·0	1·0	90	6·0	80	320	0·5	1·5	Complementary to AD161
OC20	F1	A	−100	−75	10	8·0	90	30	25	75	1·0	0·25	
OC25	F1	A	−40	−40	4·0	4·0	90	22·5	15	80	1·0	0·25	
†**OC28**	F1	A	−80	−60	10	8·0	90	30	20	55	1·0	0·25	
†**OC29**	F1	A	−60	−32	10	8·0	90	30	45	130	1·0	0·25	
†**OC35**	F1	A	−60	−32	10	8·0	90	30	25	75	1·0	0·25	
†**OC36**	F1	A	−80	−32	10	8·0	90	30	30	110	1·0	0·25	

†Available in matched pairs

germanium n-p-n low power transistor

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	at I_B (mA)
SWITCHING															
ASY74	H1	A	30	15	400	400	75	140	35	—	200	6·0	0·22	50	1·25

Transistors

germanium n-p-n medium power transistors

book 1 parts 1 and 2

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T typ (MHz)	Special Features
GENERAL PURPOSE													
AC127	K	A	32	12	500	500	90	340	100(typ.)		20	2·5	Complementary to AC128
AC176	K	A	32	20	1000	350	90	700	52	180	500	1·0(min.)	
AC187	K	A	25	15	2000	1000	90	1000	100	500	300	5·0	Complementary to AC188

germanium n-p-n high power transistor

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T_j (°C)	P_{tot} T_{mb}45°C (W)	h_{FE} min.	h_{FE} max.	at I_C (A)	f_T typ (MHz)	Special Features
GENERAL PURPOSE													
AD161	F3	A	32	20	3·0	1·0	90	4·0	80	320	0·5	3·0	Complementary to AD162

silicon n-p-n low power transistors

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_t min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	at I_B (mA)	Special Features t_{on} (ns)	t_{off} (ns)	at I_C (mA)
GENERAL PURPOSE																		
BC107‡	G1	PE	50	45	200	100	175	300	110	450	2·0	300*	0·25	10	0·5	100	500	10
BC108‡	G1	PE	30	20	200	100	175	300	110	800	2·0	300*	0·25	10	0·5	100	500	10
BC109‡	G1	PE	30	20	200	100	175	300	200	800	2·0	300*	0·25	10	0·5	N <4dB at f = 30 Hz to 15 kHz		
BC147	D	PE	50	45	200	100	125	350	110	450	2·0	300*	0·25	10	0·5	} N=2dB typ.		
BC148	D	PE	30	20	200	100	125	350	110	800	2·0	300*	0·25	10	0·5	} at f=1kHz		
BC149	D	PE	30	20	200	100	125	350	200	800	2·0	300*	0·25	10	0·5	N <4 dB at f = 30 Hz to 15 kHz		
BC547	BD	PE	50	45	200	100	150	300	110	450	2·0	300*	0·25	10	0·5	} N = 2dB typ.		
BC548	BD	PE	30	20	200	100	150	300	110	800	2·0	300*	0·25	10	0·5	} at f = 1kHz		
BC549	BD	PE	30	20	200	100	150	300	200	800	2·0	300*	0·25	10	0·5	N = 1·2dB typ. at f = 1kHz		
BF196	D1	P	40	30	25	25	125	250	27	—	4·0	400*	—	—	—	Typ. gain control range = 60dB		
BF197	D1	PE	40	25	25	25	125	250	38	—	7·0	550*	—	—	—	Typ. G_{UM} at 45MHz = 41dB		
BF200	J2	P	30	20	20	20	175	150	15	—	3·0	270	—	—	—	Typ. G_{UM} at 200 MHz = 22dB		

*Typical ‡Also available to BS9365-F112

Transistors

silicon n-p-n low power transistors (cont.)

book 1 parts 1 and 2

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	at I_B (mA)	Special Features
R.F. AMPLIFIERS																
BF115	J1	PE	50	30	30	30	175	145	40	—	20	230*	—	—	—	
BF180	J2	P	30	20	20	20	175	150	—	—	—	675*	—	—	—	N<9·5dB at 800MHz
BF181	J2	P	30	20	20	20	175	150	—	—	—	600*	—	—	—	N = 6·8 dB typ. at 900MHz
BF194	D1	PE	30	20	30	30	125	220	115*	—	1·0	260*	—	—	—	N = 4dB typ. at 100MHz
BF195	D1	PE	30	20	30	30	125	220	67*	—	1·0	200*	—	—	—	N = 4dB typ. at 100MHz
BF362	R	P	30	20	20	20	125	120	20	—	3·0	800*	—	—	—	N = 5dB typ. at 800MHz
BF363	R	P	30	20	20	20	125	120	20	—	3·0	600	—	—	—	N = 5dB typ. at 800MHz
BFR90	AR	PE	20	15	—	25	150	180	25	50*	14	5000*	—	—	—	N = 2·4dB typ. at 500MHz
BFR91	AR	PE	20	15	—	35	150	180	25	50*	30	5000*	—	—	—	N = 1·9dB typ. at 500MHz
BFT24	AR	PE	8	5	5	2·5	150	30	20	40*	1·0	1200	0·125	1·0	0·1	N = 3·8dB at 500MHz
BFW30	J2	PE	20	10	100	50	200	250	25	—	5·0	1600*	—	—	—	N < 5·0dB at 500MHz
BFX89	J2	PE	30	15	50	25	200	200	25	150	2·0	1100	—	—	—	N = 7dB at 800MHz
BFY90	J2	PE	30	15	50	25	200	200	25	150	2·0	1000	—	—	—	N < 3·5dB at 200MHz

																t_{on} max. (ns)	t_{off} max. (ns)	at I_C (mA)
SWITCHING																		
BSS38	BD	PE	120	80	250	100	150	300	20	—	1·0	60	0·7	4	0·4	—	1000	15
BSX19	G1	PE	40	15	500	—	200	360	20	60	10	400	0·3	10	0·6	12	15	10
BSX20	G1	PE	40	15	500	—	200	360	40	120	10	500	0·3	10	0·3	12	18	10
BSX21	G1	PE	120	80	50	50	175	300	20	—	4·0	60	1·8*	10	1·0	Numerical indicator tube driver		
BSY38	G1	PE	20	15	200	100	175	300	30	60	10	350*	0·25	10	1·0	14	45	100
BSY39	G1	PE	20	15	200	100	175	300	40	120	10	350*	0·25	10	1·0	14	45	100
BSY95A	G1	PE	20	15	200	100	175	300	50	200	10	200	0·35	10	0·2	t_s <50ns at 10mA		
2N2369	G1	PE	40	15	500	—	200	360	40	120	10	500	0·25	10	1·0	12	18	10
2N2369A	G1	PE	40	15	500	—	200	360	40	120	10	500	0·2	10	1·0	12	18	10

*Typical

Transistors
silicon n-p-n medium power transistors

book 1 parts 1 and 2

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	at I_B (mA)	Special Features
GENERAL PURPOSE																
BC337	BD	PE	50	45	1·0	0·5	150	625	100	600	100	200*	0·7	500	50	
BC338	BD	PE	30	25	1·0	0·5	150	625	100	600	100	200*	0·7	500	50	
BCX31	D	PE	100	80	2·0	1·0	150	880	20	100*	150	80	1·6	1·0A	100	
BCX32	D	PE	80	60	2·0	1·0	150	880	30	110*	150	80	1·6	1·0A	100	
BCX33	D	PE	60	40	2·0	1·0	150	880	40	120*	150	80	1·6	1·0A	100	
BCX34	D	PE	40	20	2·0	1·0	150	880	60	140*	150	80	1·6	1·0A	100	
BD135	BY	PE	45	45	1·5	0·5	125	6·5W†	40	250	150	250*	0·5	500	50	
BD137	BY	PE	60	60	1·5	0·5	125	6·5W†	40	160	150	250*	0·5	500	50	
BD139	BY	PE	100	80	1·5	0·5	125	6·5W†	40	160	150	250*	0·5	500	50	
BD232	BY	D	500	300	1·0	0·25	125	7·0W†	25	150	50	20*	1·0	150	15	Line-driver in t.v. receivers
BF336	H3	P	185	180	—	0·1	200	3·0W†	20	—	30	80	—	—	—	$-C_{re}$=3·5 pF max at 0·5 MHz
BF337	H3	P	250	200	—	0·1	200	3·0W†	20	—	30	80	—	—	—	$-C_{re}$=3·5 pF max. at 0·5 MHz
BF338	H3	P	300	225	—	0·1	200	3·0W†	20	—	30	80	—	—	—	$-C_{re}$=3·5 pF max. at 0·5 MHz
BF355	H3	P	300	225	0·16	0·1	200	3·0W†	—	—	—	—	25	160	10	Line-driver in t.v. receivers
BFX84	H3	PE	100	60	1·0	1·0	200	800	30	—	150	50	0·35	150	15	
BFX85	H3	PE	100	60	1·0	1·0	200	800	70	—	150	50	0·35	150	15	
BFX86	H3	PE	40	35	1·0	1·0	200	800	70	—	150	50	0·35	150	15	
BFY50‡	H3	PE	80	35	1·0	1·0	200	800	30	—	150	60	0·2	150	15	
BFY51‡	H3	PE	60	30	1·0	1·0	200	800	40	—	150	50	0·35	150	15	
BFY52‡	H3	PE	40	20	1·0	1·0	200	800	60	—	150	50	0·35	150	15	
BFY53	H3	PE	40	20	1·0	1·0	200	800	30	—	150	50	0·35	150	15	
2N696	H3	PE	60	40	0·5	—	175	600	20	60	150	40	1·5	150	15	
2N697	H3	PE	60	40	0·5	—	175	600	120	150	150	40	1·5	150	15	
2N1613	H3	PE	75	30	0·5	—	200	800	40	120	150	60*	1·5	150	15	
2N1711	H3	PE	75	30	1·0	—	200	800	100	300	150	70*	1·5	150	15	
2N2297	H3	PE	80	35	—	1·0	200	800	40	120	150	60*	0·2	150	15	
2N3053	H3	PE	60	40	—	0·7	200	5·0W†	50	250	150	100	1·4	150	15	
R. F. AMPLIFIER																
BFR96	AR	PE	20	15	0·15	0·075	175	500	30	—	50	5000	—	—	—	Typ. G_{UM} at 500MHz=15dB

‡ Also available to BS9365-F012 specification † at T_{case} =25°C *Typical

Transistors
silicon n-p-n medium power transistors (cont.)

book 1 parts 1 and 2

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	at I_B (mA)	Special Features t_{on} max. (ns)	t_{off} max. (ns)	at I_C (mA)
SWITCHING																		
BSV64	H3	PE	100	60	5·0	2·0	200	870	40	—	2A	100*	1·0	5A	500	600	1200	5A
BSW66	H3	PE	100	100	2·0	1·0	200	800	40	—	100	80*	0·4	500	50	For relays and other highly inductive load switching applications		
BSW67	H3	PE	120	120	2·0	1·0	200	800	40	—	100	80*	0·4	500	50			
BSW68	H3	PE	150	150	2·0	1·0	200	800	40	—	100	80*	0·5	500	50			
BSX59	H3	PE	70	45	—	1·0	200	800	25	—	500	250	0·3	150	15	35	60	500
BSX61	H3	PE	70	45	—	1·0	200	800	25	—	500	250	0·5	150	15	50	100	500

silicon n-p-n high power transistors

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T_j (°C)	P_{tot} T_{mb} = 25°C (W)	h_{FE} min.	h_{FE} max.	at I_C (A)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (A)	at I_B (mA)	Special Features
GENERAL PURPOSE																
BD124	F3	PE	70	45	4·0	2·0	175	15	35	—	0·5	60	0·9	2·0	200	
BD131	BY	PE	70	45	6·0	3·0	150	15	40	—	0·5	60	0·7	2·0	200	
BD133	BY	PE	90	60	6·0	3·0	150	15	40	—	0·5	60	0·7	2·0	200	
BD160	F1	D	250	—	7·0	5·0	150	10	—	—	—	—	1·6	5·0	1·0A	For line deflection and E-W pincushion correction circuits
BD181	F2	D	55	45	15	10	200	78	20	70	3•0	—	—	—	—	
BD182	F2	D	70	60	15	15	200	117	20	70	4·0	—	—	—	—	For use in high quality audio amplifiers.
BD183	F2	D	85	80	15	15	200	117	20	70	3·0	—	—	—	—	
BD184	F2	D	95	90	15	15	200	117	20	70	4·0	—	—	—	—	
BD201	CD	EB	60	45	12	8·0	150	60	30	—	3·0	3·0	1·0	3·0	300	Complementary to BD202
BD203	CD	EB	60	60	12	8·0	150	60	30	—	2·0	3·0	1·0	3·0	300	Complementary to BD204
BD233	BY	EB	45	45	6·0	2·0	150	25	25	—	1·0	3·0	0·6	1·0	100	
BD235	BY	EB	60	60	6·0	2·0	150	25	25	—	1·0	3·0	0·6	1·0	100	
BD237	BY	EB	100	80	6·0	2·0	150	25	25	—	1·0	3·0	0·6	1·0	100	
BD433	BY	EB	22	22	7·0	4·0	150	36	50	—	2·0	3·0	0·5	2·0	200	Complementary to BD434
BD435	BY	EB	32	32	7·0	4·0	150	36	50	—	2·0	3·0	0·5	2·0	200	Complementary to BD436
BD437	BY	EB	45	45	7·0	4·0	150	36	40	—	2·0	3·0	0·7	3·0	300	Complementary to BD438
BDX77	CD	EB	80	80	12	8·0	150	55	30	—	2·0	3·0	1·0	3·0	300	Complementary to BDX78
BDY20	F2	D	100	60	15	15	200	115	20	70	4·0	1·0*	1·1	4·0	400	
BDY38	F2	D	50	40	6·0	6·0	200	115	30	—	2·0	1·0*	0·7	2·0	200	
BDY90	F1	D	120	100	15	10	175	40	30	120	5·0	70*	0·5	5·0	500	
BDY91	F1	D	100	80	15	10	175	40	30	120	5·0	70*	0·5	5·0	500	
BDY92	F1	D	80	60	15	10	175	40	30	120	5·0	70*	0·5	5·0	500	
BDY93	F1	D	750‡	350	6·0	3·0	150	30	15	60	1·0	12*	1·0	1·0	100	For use in converters, inverters, switching and motor control systems.
BDY94	F1	D	750‡	300	6·0	3·0	150	30	15	60	1·0	12*	1·0	1·0	100	
BDY95	F1	D	600‡	250	6·0	3·0	150	30	15	60	1·0	12*	1·0	1·0	100	
BDY96	F1	D	750‡	350	15	10	150	40	15	60	2·0	10*	1·0	2·0	200	
BDY97	F1	D	750‡	300	15	10	150	40	15	60	2·0	10*	1·0	2·0	200	
BDY98	F1	D	600‡	250	15	10	150	40	15	60	2·0	10*	1·0	2·0	200	
2N3055	F2	D	100	60	—	15	200	115	20	70	4·0	0·8	1·1	4·0	400	
2N3442	F2	D	160	140	15	10	200	117	20	70	3·0	1·0*	5·0	10	2·0A	
2N4347	F2	D	140	120	10	5·0	200	100	20	70	4·0	1·0*	5·0	5·0	1·0A	

*Typical ‡V_{CESM}

Transistors

silicon n-p-n high power transistors (cont.)

book 1 parts 1 and 2

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T_j (°C)	P_{tot} T_{mb} = 25°C (W)	h_{FE} min.	h_{FE} max.	at I_C (A)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (A)	at I_B (mA)	Special Features t_{on} max. (ns)	t_{off} max. (ns)	at I_C (A)
SWITCHING																		
BDX35	BY	PE	100†	60	10	5·0	175	15	45	450	0·5	100	0·9	5·0	500	—	350*	5·0
BDX36	BY	PE	120†	60	10	5·0	175	15	45	450	0·5	100	0·9	5·0	500	—	350*	5·0
BDX37	BY	PE	120†	80	10	5·0	175	15	45	450	0·5	100	0·7	5·0	500	—	350*	5·0
BU126	FI	D	750‡	300	6·0	3·0	125	30	15	60	1·0	8·0*	10	2·5	250	For use in switched mode power supplies of colour t.v. receivers.		
BU133	FI	D	750‡	250	6·0	3·0	125	30	15	80	1·0	8·0*	10	2·5	250			
BU204	FI	D	1300‡	600	3·0	2·5	115	10	2	—	2·0	7·5*	5·0	2·0	1A	For use in horizontal deflection circuits of t.v. receivers.		
BU205	FI	D	1500‡	700	3·0	2·5	115	10	2	—	2·0	7·5*	5·0	2·0	1A			
BU206	FI	D	1700‡	800	3·0	2·5	115	10	1·8	—	2·0	7·5*	5·0	2·0	1·1A			
BU207	F1	D	1300‡	600	7·5	5·0	115	12·5	2·25	—	4·5	7*	5.0	4·5	2A	For use in horizontal deflection circuits of colour t.v. receivers		
BU208	F1	D	1500‡	700	7·5	5·0	115	12·5	2·25	—	4·5	7*	5·0	4·5	2A			
BU209	F1	D	1700‡	800	6·0	4·0	115	12·5	2·25	—	3·0	7*	5·0	3·0	1·3A			
BUY86	FI	PE	200	100	10	7·0	150	50	50	—	1·0	100*	1·0	7·0	700	1000	3000	7·0
BUY87	FI	PE	300	150	—	7·0	150	50	30	—	2·0	100*	1·0	7·0	700	800	650	7·0

*Typical ‡V_{CESM} †peak value

R.F. power transistors

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T_j (°C)	P_{tot} T_{mb} = 25°C (W)	h_{FE} min.	h_{FE} max.	at I_C (A)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (A)	at I_B (mA)	P_O typ. (W)	G_p typ. (dB)	at f (MHz)	at V_{CC} (V)
BFR94	V	PE	30	25	0·3	0·15	200	3·5	40	—	0·15	3500*	—	—	—	—	—	—	—
BFW16A	H3	PE	40	25	0·3	0·15	200	1·5	25	—	0·15	1200*	—	—	—	90	6·5	800	18
BFW17A	H3	PE	40	25	0·3	0·15	200	1·5	25	—	0·15	1100*	—	—	—	150	16	200	18
BLW60	BT	PE	36	18	20	8·0	200	103	20	50*	1·0	550*	—	—	—	45	5·5	175	12·5
BLW64	BT	PE	60	30	12	4·0	200	40	25	80	1·0	900*	—	—	—	>15	>9·5	224	25
BLX13	BT	PE	65	36	6·0	3·0	200	70	10	120	1·0	500*	—	—	—	25§	>18	28	28
BLX14	BU	PE	85	36	12	4·0	200	88	15	100	1·4	250*	1·0	0·7	140	50§	>13	28	28
BLX15	BU	PE	110	55	20	6·5	200	195	10	70	1·4	275*	1·0	0·7	140	150§	>14	28	50
BLX65	H3	PE	36	18	2·0	0·7	150	3·0**	10	—	0·1	1400*	0·1*	0·1	20	2·0	—	470	13·8
BLX66	BS	PE	36	18	2·0	0·7	150	4·0**	10	—	0·1	1400*	0·1*	0·1	20	2·5	—	470	13·8
BLX67	V	PE	36	18	2·0	0·7	150	4·5**	10	—	0·1	1400*	0·1*	0·1	20	3·0	—	470	13·8
BLX69	W	PE	36	18	10	3·5	200	50	30*	—	1·0	1000*	0·5	0·7	140	20	>4	470	13·5
BLX91	V	PE	65	33	0·8	0·4	200	4·0	10	—	0·1	1200*	—	—	—	1·45	12	470	28
BLX92	V	PE	65	33	2·0	0·7	200	6·0	10	—	0·1	1200*	0·17*	0·1	20	2·5	—	1000	28
BLX93	V	PE	65	33	3·0	1·0	150	12·5	10	—	0·1	1200*	—	—	—	5·0	—	1000	28
BLX94	W	PE	65	33	6·0	2·0	200	50	15	—	1·0	1000*	—	—	—	20	>6	470	28
BLX95	BT	PE	65	33	12	4·0	200	87·5	15	—	1·4	1000*	—	—	—	40	>4·5	470	28
BLX98	W	PE	40	27	4·0	2·0	200	21·5	20	—	1·0	2000	0·75	0·5	100	>3·5	>5·0	860	25
BLY33	H3	PE	66‡	33	1·5	0·5	150	5	10	—	0·2	250	—	—	—	2·0†	8	175	13·8
BLY34	H3	PE	40‡	20	1·5	0·5	150	5	10	—	0·2	250	—	—	—	3·0	8	175	13·8
BLY53A	V	PE	36	18	4·0	1·0	150	8**	10	—	0·5	1300*	0·2	0·5	100	>7·0	5·4	470	13·8

* Typical ** at T_{mb}=90°C † a.m. operation ‡ V_{CES} (f. >1·0 MHz) § s.s.b. operation

Transistors

R.F. power transistors (cont.) book 1 parts 1 and 2

Type	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	Tj (°C)	P_{tot} T_{mb}= 25°C (W)	h_{FE} min.	h_{FE} max.	at I_C (A)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (A)	at I_B (mA)	P_O typ. (W)	G_P typ. (dB)	at f (MHz)	at V_{CC} (V)
BLY83	V	PE	66	33	7·5	2·5	150	12**	10	220	1·0	250	—	—	—	7††	13	175	13·8
BLY84	V	PE	40	20	7·5	2·5	150	12**	10	—	1·0	250	—	—	—	13.2	5.8	175	13·8
BLY85	V	PE	40‡	20	3·0	1·0	150	10	10	—	0·2	250	—	—	—	>4	10	175	13·8
BLY89A	BT	PE	36	18	10	5·0	200	70	10	120	1·0	650*	—	—	—	25	>6	175	13·5
BLY90	BU	PE	36	18	20	8·0	200	130	10	—	1·0	550*	—	—	—	50	>4	175	12·5
BLY93A	BT	PE	65	36	9·0	3·0	200	70	10	120	1·0	500*	—	—	—	25	>9	175	28
BLY94	BU	PE	65	36	12	6·0	200	130	10	120	1·0	500*	—	—	—	50	>7	175	28
BLY97	V	PE	66‡	33	3·0	1·0	150	10	10	—	0·2	250	—	—	—	>4	20	175	24
BLY98	V	PE	60	33	3·0	1·0	150	8**	10	—	0·5	800*	0·2	0·5	100	7	8	470	28
810BLY/A	AG	PE	55	35	9·0	3·0	—	22·5	20	100	1·0	300*	1·0	1·0	200	>20	>10	70	28
2N3375	AG	PE	65	40	1·5	0·5	200	11·6	10	100	0·25	500*	1·0	0·50	100	>3·0	—	400	28
2N3553	H3	PE	65	40	1·0	0·35	200	7·0	10	100	0·25	500*	1·0	0·25	50	>2·5	—	175	28
2N3632	AG	PE	65	40	3·0	1·0	200	23	10	150	0·25	400*	1·0	1·0	200	13·5	—	175	28
2N3866	H3	PE	55	30	0·4	0·4	200	5·0	10	200	0·05	700*	1·0	0·1	20	1·0	>10	400	28
2N4427	H3	PE	40	20	0·4	0·4	200	3·5	10	200	0·1	700*	0·5	0·1	20	1·0	>10	175	12

*Typical ‡V_{CES} (f. >1·0 MHz) **at T_{mb}=90°C †a.m. operation

†† a.m. operation in 2-stage amplifier incorporating BLY33 for a typical input power to BLY33 of 350mW and envelope distortion less than 5% at 80% modulation

broadband R.F. power modules

Type No.	Description	Construction	Frequency Range (MHz)	Supply Voltage (V)	Min. Power Output (W)	at P_{DR} (W)	Efficiency Typ. (%)
BGY21	U.H.F. amplifier module designed for portable equipment	CC	420–470	12	1·2	0·02	40
BGY22	U.H.F. amplifier modules designed for mobile communications equipments	CC	380–512	13·5	2·5	0·05	50
BGY23			380–512	13·5	7	2·5	70
BGY22A			420–480	12·5	2·5	0·05	50
BGY23A			420–480	12·5	7	2·5	70
437BGY	V.H.F. amplifier modules designed for mobile communications equipments		148–174	12·5	18	0·1	>40
438BGY			68–88	12·5	18	0·1	>40

silicon planar n-p-n differential amplifiers

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	Special Features I_{C1}/I_{C2} ratio at equal V_{BE} min.	max.
BCY87	BG1	PE	45	40	30	175	150	100	450	0·05	50	0·9	1·11
BCY88	BG1	PE	45	40	30	175	150	120	600	0·5	50	0·8	1·25
BCY89	BG1	PE	45	40	30	175	150	100	600	10	50	0·67	1·5

Transistors
silicon p-n-p low power transistors

book 1 parts 1 and 2

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	at I_B (mA)	Special Features
GENERAL PURPOSE																
BC157	D	PE	−50	−45	200	100	125	350	75†	260	2·0	150*	−0·3	10	0·5	N <10dB at f = 1kHz
BC158	D	PE	−30	−25	200	100	125	350	75†	500	2·0	150*	−0·3	10	0·5	N <10dB at f = 1kHz
BC159	D	PE	−25	−20	200	100	125	350	125†	500	2·0	150*	−0·3	10	0·5	N <4dB at f = 30Hz to 15kHz
BC557	BD	PE	−50	−45	200	100	150	300	75†	260	2·0	150*	−0·3	10	0·5	N <10dB at f = 1kHz
BC558	BD	PE	−30	−25	200	100	150	300	75†	500	2·0	150*	−0·3	10	0·5	N <10dB at f = 1kHz
BC559	BD	PE	−25	−20	200	100	150	300	125†	500	2·0	150*	−0·3	10	0·5	N <4dB at f = 1kHz
BCY30	H2	A	−64	−50	100	50	150	250	10	35	20	0·25	−0·55	20	3·0	
BCY31	H2	A	−64	−50	100	50	150	250	15	60	20	0·25	−0·55	20	3·0	
BCY32	H2	A	−64	−50	100	50	150	250	20	70	20	0·25	−0·55	20	3·0	
BCY33	H2	A	−32	−25	100	50	150	250	10	35	20	0·4	−0·55	20	3·0	
BCY34	H2	A	−32	−25	100	50	150	250	15	60	20	0·6	−0·55	20	3·0	
BCY38	H1	A	−32	−24	500	250	150	410	10	30	150	0·45	−1·1	150	15	
BCY39	H1	A	−64	−60	500	250	150	410	10	50	150	0·45	−1·1	150	15	
BCY40	H1	A	−32	−24	500	250	150	410	15	120	150	0·85	−1·1	150	15	
BCY54	H1	A	−50	−50	500	250	150	410	12	70	150	0·45	−1·1	150	15	
BCY70‡	G1	PE	−50	−40	200	200	200	350	50	—	10	250	−0·25	10	1·0	
BCY71‡	G1	PE	−45	−45	200	200	200	350	100	600	10	200	−0·25	10	1·0	N <2dB at f = 10Hz to 10kHz
BCY72‡	G1	PE	−25	−25	200	200	200	350	50	—	10	200	−0·25	10	1·0	
BFX37	G1	PE	−60	−60	—	50	200	360	70	300	0·01	40	−0·40	50	5·0	N <3dB at f = 10Hz to 10kHz
R.F. AMPLIFIERS																
BF324	BD	PE	−30	−30	—	25	150	250	25	—	4·0	550*	—	—	—	N = 3dB typ at f = 100MHz
BF450	BD1	PE	−40	−40	—	25	150	250	60	—	1·0	325*	—	—	—	
BF451	BD1	PE	−40	−40	—	25	150	250	30	—	1·0	325*	—	—	—	
SWITCHING																
BSS68	BD	PE	−110	−100	100	100	150	300	30	—	25	50	−0·25	25	2·5	intended for anode switching of numerical indicator tubes.
BSV68	G1	PE	−110	−100	100	100	150	250	30	—	25	50	−0·25	25	2·5	

*Typical †h_{fe} ‡also available to BS9365–F009 specification

Transistors

silicon p-n-p medium power transistors

book 1 parts 1 and 2

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	at I_B (mA)	Special Features
GENERAL PURPOSE																
BC327	BD	PE	−50	−45	1·0A	500	150	625	100	600	100	100*	−0·7	500	50	Complementary to BC337
BC328	BD	PE	−30	−25	1·0A	500	150	625	100	600	100	100*	−0·7	500	50	Complementary to BC338
BCX35	D	PE	−80	−80	—	600	150	880	90*	—	150	100	—	—	—	—
BCX36	D	PE	−60	−60	—	600	150	880	90*	—	150	100	—	—	—	—
BCX37	D	PE	−40	−40	—	600	150	880	90*	—	150	100	—	—	—	—
BD132	BY	PE	−45	−45	6·0A	3·0A	150	15W	40	—	500	60	−0·3	500	50	Complementary to BD131
BD136	BY	PE	−45	−45	1·5A	500	125	6·5W	40	250	150	75*	−0·5	500	50	Complementary to BD135
BD138	BY	PE	−60	−60	1·5A	500	125	6·5W	40	160	150	75*	−0·5	500	50	Complementary to BD137
BD140	BY	PE	−100	−80	1·5A	500	125	6·5W	40	160	150	75*	−0·5	500	50	Complementary to BD139
BFT44	H3	PE	−300	−300	—	500	200	5W	50	—	10	60*	−5·0	500	100	
BFT45	H3	PE	−250	−250	—	500	200	5W	50	—	10	60*	−3·0	500	100	
BFX29‡	H3	PE	−60	−60	600	600	200	600	50	—	10	100	−0·4	150	15	
BFX30§	H3	PE	−65	−65	600	600	200	600	50	—	10	—	—	—	—	t_s <250ns at 100mA
BFX87	H3	PE	−50	−50	600	600	200	600	40	—	10	100	−0·4	150	15	
BFX88	H3	PE	−40	−40	600	600	200	600	40	—	10	100	−0·4	150	15	

*Typical ‡ also available to BS9365–F010 specification § also available to BS9365–F011 specification

Type No.	Construction	Technique	Maximum ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (mA)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	at I_B (mA)	t_{on} max. (ns)	t_{off} max. (ns)	at I_C (mA)
SWITCHING																		
2N2904	H3	PE	−60	−40	—	600	200	600	40	120	150	200	−0·4	150	15	45	100	150
2N2904A	H3	PE	−60	−60	—	600	200	600	40	120	150	200	−0·4	150	15	45	100	150
2N2905	H3	PE	−60	−40	—	600	200	600	100	300	150	200	−0·4	150	15	45	100	150
2N2905A	H3	PE	−60	−60	—	600	200	600	100	300	150	200	−0·4	150	15	45	100	150
2N2906	G1	PE	−60	−40	—	600	200	400	40	120	150	200	−0·4	150	15	45	100	150
2N2906A	G1	PE	−60	−60	—	600	200	400	40	120	150	200	−0·4	150	15	45	100	150
2N2907	G1	PE	−60	−40	—	600	200	400	100	300	150	200	−0·4	150	15	45	100	150
2N2907A	G1	PE	−60	−60	—	600	200	400	100	300	150	200	−0·4	150	15	45	100	150

† at $T_{case} \leq 25°C$

Transistors

silicon p-n-p high power transistors

book 1 parts 1 and 2

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T_j (°C)	P_{tot} T_{mb} = 25°C (W)	h_{FE} min.	h_{FE} max.	at I_C (A)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (A)	at I_B (mA)	Special Features
GENERAL PURPOSE																
BD202	CD	EB	−60	−45	12	8·0	150	60	30	—	3·0	3·0	−1·0	3·0	300	Complementary to BD201
BD204	CD	EB	−60	−60	12	8·0	150	60	30	—	2·0	3·0	−1·0	3·0	300	Complementary to BD203
BD234	BY	EB	−45	−45	6·0	2·0	150	25	25	—	1·0	3·0	−0·6	1·0	100	
BD236	BY	EB	−60	−60	6·0	2·0	150	25	25	—	1·0	3·0	−0·6	1·0	100	
BD238	BY	EB	−100	−80	6·0	2·0	150	25	25	—	1·0	3·0	−0·6	1·0	100	
BD434	BY	EB	−22	−22	7·0	4·0	150	36	50	—	2.0	3.0	−0·5	2·0	200	Complementary to BD433
BD436	BY	EB	−32	−32	7·0	4·0	150	36	50	—	2.0	3·0	−0·5	2.0	200	Complementary to BD435
BD438	BY	EB	−45	−45	7·0	4.0	150	36	40	—	2·0	3·0	−0·7	3·0	300	Complementary to BD437
BDX78	CD	EB	−80	−80	12	8·0	150	55	30	—	2·0	3·0	−1·0	3·0	300	Complementary to BDX77

silicon n-channel field effect transistors

Type No.	Construction	Technique	Maximum Ratings V_{DB} (V)	V_{SB} (V)	$\pm V_{GBM}$ (V)	I_{DM} max. (mA)	T_j (°C)	P_{tot} at 25°C (mW)	$r_{DS(on)}$ (Ω)	$r_{DS(off)}$ (Ω)	Special Features
INSULATED GATE FET (MOST)											
BFR29	J5	PE	30	30	10	50	125	200	—	—	For linear applications in the audio as well as the i.f. and v.h.f. frequency region
BSV81	J5	PE	30	30	10	50	125	200	<50	$>1\times10^{10}$	For switching and particularly for chopping applications

DUAL INSULATED GATE FET ('Tetrode' MOST)

Type No.	Construction	Technique	Maximum Ratings V_{DS} Max. (V)	V_{GS} max. (V)	I_D max. (mA)	T_j (°C)	P_{tot} at 25°C (mW)	I_{GSS} max. (nA)	$-C_{rss}$ typ. (fF)	G typ. (dB)	N max. (dB)	Measured at f (MHz)
BFS28	J4	PE	20	8	20	135	200	1	25	18	4	200
BFR84	—	Protected gate version of BFS28										

Transistors
silicon n-channel field effect transistors (cont.)

book 1 parts 1 and 2

Type No.	Construction	Technique	Maximum Ratings V_{DGM} (V)	V_{GSM} (V)	V_{DSM} (V)	I_{GM} (mA)	T_j (°C)	P_{tot} at 25°C (mW)	$V_{(P)GS}$ max. (V)	at I_D (nA)	I_{GSS} max. (nA)	I_{DSS} ($V_{GS}=0$) min. (mA)	max. (mA)	at V_{DS} (V)	Special Features
JUNCTION FET															
BF244A	BC	PE	30	−30	30	10	150	300	8	10	5	2	6·5		N = 1·5dB typ at
BF244B												6	15	15	100MHz, R_G = 1kΩ
BF244C												12	25		
BF245A	BD2	PE	30	−30	30	10	150	300	8	10	5	2	6·5		
BF245B												6	15	15	N = 1·5dB typ at 100MHz
BF245C												12	25		R_G = 1kΩ
BF256A	BD2	PE	30	−30	30	10	150	300	8	10	5	3	7		
BF256B												6	13	15	G_p = 11dB typ. at
BF256C												11	18		800MHz, R_S = 47Ω
BFW10	J3	PE	30	−30	30	10	200	300	8	0·5	0·5	8	20	15	N < 2·5dB at 100MHz
BFW11	J3	PE	30	−30	30	10	200	300	6	0·5	0·5	4	10	15	Noise Voltage < 75nV/√Hz at 10Hz
BFW12	J3	PE	30	−30	30	5	200	150	2·5	0·5	0·1	1	5	15	
BFW13									1·2			0·2	1·5		
BFW61	J3	PE	25	−25	25	10	200	300	8	1	1	2	20	15	
BSV78	G2	PE	40	−40	40	50	175	350	11	1	0·25	50	—	15	$r_{DS(on)}$ < 25Ω
BSV79	G2	PE	40	−40	40	50	175	350	7	1	0·25	20	—	15	$r_{DS(on)}$ < 40Ω
BSV80	G2	PE	40	−40	40	50	175	350	5	1	0·25	10	—	15	$r_{DS(on)}$ < 60Ω
2N3823	J3	PE	30	−30	30	10	200	300	8	0·5	0·5	4	20	15	N < 2·5dB at 100MHz
Matched Pairs															
BFS21	J3†	PE	30	−30	30	10	125	250	6·0	0·5	0·5	4	10	15	$V_{G1S1}-V_{G2S2}$ < 20mV I_{D1}/I_{D2} = 0·95 to 1·05 N < 75nV/√Hz at 10Hz
BFS21A	J3†	PE	30	−30	30	10	125	250	6·0	0·5	0·5	4	10	15	$V_{G1S1}-V_{G2S2}$ < 10mV I_{D1}/I_{D2} = 0·95 to 1 N < 75nV/√Hz at 10Hz

† The devices are supplied in matched pairs, mounted in a heat conducting S-clip.

Dual Field Effect Transistors

										ΔI_G (pA)	ΔV_{GS} (mV)	CMRR (dB)	
BFQ10	BG2	PE	30	−30	30	10	200	250	3·5	<10	< 5	>100	
BFQ11											<10	>90	Intended for
BFQ12											<10	>90	high-performance,
BFQ13											<10	>90	low-level differential
BFQ14											<15	>90	amplifiers
BFQ15											<20	>90	
BFQ16											<50	>80	

silicon planar p-n-p-n switches

Type No.	Description		Maximum Ratings V_{GaK} (V)	V_{GaA} (V)	I_{ARM} (mA)	I_A (mA)	T_j (°C)	P_{tot} at 25°C (mW)	V_A (V)	at I_A (mA)
BR101	p-n-p-n controlled switch for use as a saw tooth generator in t.v. field timebase applications	J6	50	50	500	100	150	250	<1·4	50
BRY39	Integrated p-n-p-n transistor pair Applications include controlled switch, programmable unijunction transistor and thyristor tetrode.	J6	70	70	2500	175	150	275	<1·4	50
BRY56	Trigger device for switching applications such as motor control, oscillators, relay replacements, timers, pulse shapers.	BD3	70	70	2500	175	150	300	<1·4	100

Transistors
darlington transistors

book 1 parts 1 and 2

Type No	Construction	Polarity	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	I_{CM} (A)	$I_{C(AV)}$ (A)	T (°C)	h_{FE} min.	at I_C (A)	f_T typ. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (A)	at I_B (mA)	Special Features t_{on} max. (µs)	t_{off} max. (µs)	at I_C (A)
3.5W ($T_{case} \leqslant 25°C$)																
BCX21	H3	n-p-n	60	45	—	1·0	150	2000	0·15	—	1·6	1·0	1·0	0·4	1·5	0·5
5.0W ($T_{mb} \leqslant 100°C$)																
BDX42	BY	n-p-n	60	45	—	1·0	150	1500	0·5	—	1·6	1·0	4·0	0·4	1·5	0·5
BDX43			80	60									1·0			
BDX44			100	80									4·0			
5.0W ($T_{case} \leqslant 25°C$) Complementary types																
BSS50	H3	n-p-n	60	45	—	1·0	200	1500	0·5	—	1·6	1·0	4·0	0·4	1·5	0·5
BSS51			80	60									1·0			
BSS52			100	80									4·0			
BSS60	H3	p-n-p	−60	−45	—	1·0	200	1500	0·5	—	−1·6	1·0	4·0	4·0	1·5	0·5
BSS61			−80	−60									1·0			
36W ($T_{mb} \leqslant 25°C$) Complementary types																
BD262	BY	p-n-p	−60	−60	6·0	4·0	150	750	1·5	7·0	−2·5	1·5	6·0			
BD262A			−80	−80												
BD262B			−100	−100												
BD263	BY	n-p-n	80	60	6·0	4·0	150	750	1·5	7·0	2·5	1·5	6·0			
BD263A			100	80												
BD263B			120	100												
55W ($T_{mb} \leqslant 25°C$) Complementary types																
BD266	CD	p-n-p	−60	−60	12	8·0	150	750	3·0	2·5	−2·0	3·0	12	0·5*	2·5*	3·0
BD266A			−80	−80												
BD267	CD	n-p-n	80	60	12	8·0	150	750	3·0	2·5	2·0	3·0	12	0·5*	2·5*	3·0
BD267A			100	80												
90W ($T_{mb} \leqslant 25°C$) Complementary types																
BDX62	F2	p-n-p	−60	−60	12	8·0	200	1000	3·0	7·0	−2·0	3·0	12	0·5*	2·5*	3·0
BDX62A			−80	−80												
BDX62B			−100	−100												
BDX63	F2	n-p-n	80	60	12	8·0	200	1000	3·0	7·0	2·0	3·0	12	0·5*	2·5*	3·0
BDX63A			100	80												
BDX63B			120	100												
117W ($T_{mb} \leqslant 25°C$) Complementary types																
BDX64	F2	p-n-p	−60	−60	16	12	200	1000	5·0	−2·5	2·5	5·0	20	0·4*	3·0*	5·0
BDX64A			−80	−80												
BDX65	F2	n-p-n	80	60	16	12	200	1000	5·0	2·5	2·5	5·0	20	0·4*	3·0*	5·0
BDX65A			100	80												
150W ($T_{mb} \leqslant 25°C$) Complementary types																
BDX66	F2	p-n-p	−60	−60	20	16	200	1000	10	7·0	−2·0	10	40			
BDX66A			−80	−80												
BDX67	F2	n-p-n	80	60	20	16	200	1000	10	7·0	2·0	10	40			
BDX67A			100	80												

*Typical

Microminiature devices
primarily intended for hybrid, thin and thick film circuits

book 1 parts 1 and 2

n-p-n transistors

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	at I_B (mA)	Nearest type in TO-18 envelope
BCW31R	Y1	PE	30	20	100	150	200	110	220	2·0	300*	0·25	10	0·5	BC108A
BCW32R	Y1	PE	30	20	100	150	200	200	450	2·0	300*	0·25	10	0·5	BC108B
BCW33R	Y1	PE	30	20	100	150	200	420	800	2·0	300*	0·25	10	0·5	BC108C
BCW71R	Y1	PE	50	45	100	150	200	110	220	2·0	300*	0·25	10	0·5	BC107A
BCW72R	Y1	PE	50	45	100	150	200	200	450	2·0	300*	0·25	10	0·5	BC107B
BCX19	Y7	PE	50	45	500	150	310	100	600	100	200*	0·62	500	50	BC337
BCX20	Y7	PE	30	25	500	150	310	100	600	100	200*	0·62	500	50	BC338
BFR92	Y7	PE	20	15	25	150	180	25	—	14	5000*	—	—	—	BFR90
BFR93	Y7	PE	15	12	35	150	180	25	—	30	5000*	—	—	—	BFR91
BFS17R	Y1	PE	25	15	25	150	200	25	150	2·0	1300*	—	—	—	BFY90
BFS20R	Y1	PE	30	20	25	150	200	40	—	7·0	275	—	—	—	BF173
BSV52R	Y1	PE	20	12	100	150	200	40	120	10	400	0·25	10	1·0	BSX20
BFT25	Y7	PE	8	5	2·5	150	30	20	40*	1·0	1200	0·175	1·0	0·1	BFT24 (AR outline)

p-n-p transistors

Type No.	Construction	Technique	Maximum Ratings V_{CBO} (V)	V_{CEO} (V)	$I_{C(AV)}$ (mA)	T_j (°C)	P_{tot} at 25°C (mW)	h_{FE} min.	h_{FE} max.	at I_C (mA)	f_T min. (MHz)	$V_{CE(sat)}$ max. (V)	at I_C (mA)	at I_B (mA)	Nearest type in TO-18 envelope
BCW29R	Y1	PE	−30	−20	100	150	200	120	260	2·0	150*	−0·3	10	0·5	BC178A
BCW30R	Y1	PE	−30	−20	100	150	200	215	500	2·0	150*	−0·3	10	0·5	BC178B
BCW69R	Y1	PE	−50	−45	100	150	200	120	260	2·0	150*	−0·3	10	0·5	BC177A
BCW70R	Y1	PE	−50	−45	100	150	200	215	500	2·0	150*	−0·3	10	0·5	BC177B
BCX17	Y7	PE	−50	−30	500	150	310	100	600	100	100*	−0·62	500	50	BC327
BCX18	Y7	PE	−45	−25	500	150	310	100	600	100	100*	−0·62	500	50	BC328

*Typical

n-channel junction field effect transistors

Type No.	Construction	Technique	Maximum Ratings V_{OGO} (V)	V_{GSO} (V)	$\pm V_{DS}$ (V)	I_F (mA)	T_j (°C)	P_{tot} at 25°C (mW)	$V_{(P)GS}$ max. (V)	at I_D (nA)	$-I_{GSS}$ max. (nA)	I_{DSS} (V_{GS} = 0) min. (mA)	I_{DSS} (V_{GS} = 0) max. (mA)	at V_{DS} (V)
BFR30	Y2	PE	25	−25	25	5·0	150	200	−5·0	0·5	0·2	4·0	10	10
BFR31	Y2	PE	25	−25	25	5·0	150	200	−2·5	0·5	0·2	1·0	5·0	10

diodes

Type No.	Construction	Technique	Description	V_{RRM} (V)	I_{FRM} (mA)	$I_{F(AV)}$ (mA)	Max. Reverse Recovery Time, t_{rr} Measured at: t_{rr} (ns)	I_F (mA)	I_R (mA)	R_L (Ω)	Nearest type
BAV70	Y4	PE	Common cathode double diode	70	200	100	6·0	10	1	100	2×1N4148
BAW56	Y5	PE	Common anode double diode								
BAV99	Y6	PE	Two diodes in series intended for high speed switching.								

Microminiature devices

silicon planar voltage reference diodes

200mW (T_{amb} = 25°C) ±5% voltage tolerance, Construction Y3

book 1 part 3

Type No.	Nom. Zener Voltage (V)	Measured at Test I_z Min. Voltage (V)	Measured at Test I_z Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (mV/°C)	Test I_z (mA)	Max. I_R at V_R (μA)	Max. I_R at V_R (V)
BZX84								
—C4V7	4·7	4·4	5·0	80	−1·4	5·0	3·0	2·0
—C5V1	5·1	4·8	5·4	60	−0·8	5·0	2·0	2·0
—C5V6	5·6	5·2	6·0	40	+1·2	5·0	1·0	2·0
—C6V2	6·2	5·8	6·6	10	+2·3	5·0	3·0	4·0
—C6V8	6·8	6·4	7·2	15	+3·0	5·0	2·0	4·0
—C7V5	7·5	7·0	7·9	15	+4·0	5·0	1·0	5·0
—C8V2	8·2	7·7	8·7	15	+4·6	5·0	0·7	5·0
—C9V1	9·1	8·5	9·6	15	+5·5	5·0	0·5	6·0
—C10	10	9·4	10·6	20	+6·4	5·0	0·2	7·0
—C11	11	10·4	11·6	20	+7·4	5·0	0·1	8·0
—C12	12	11·4	12·7	25	+8·4	5·0	0·1	8·0

Photodevices

phototransistors

Type No.	Spectral Response Peak (μm)	Spectral Response Cut-off (μm)	Description and Construction		Max. Dark Current (μA)	Sensitivity min. (μA/lux)	Cut-off Frequency (kHz)	Tj max. (°C)	V_{CE} max. (V)	I_{CM} max. (mA)
BPX25	0·8	1·1	Silicon n-p-n general purpose phototransistor with lensed window	J2	0·5	5·0	200	150	32	100
BPX29			Silicon n-p-n general purpose phototransistor with plane window			0·25	150			
BPX25A	0·8	1·1	Silicon n-p-n "Darlington-pair" phototransistor with lensed window.	J2	0·25	50	—	175	30	100
BPX29A			Silicon n-p-n "Darlington-pair" phototransistor with plane window			2	—			

photodiodes

Type No.	Spectral Response Peak (μm)	Spectral Response Cut-off (μm)	Description and Construction		Max. Dark Current (μA)	Sensitivity min. (μA/lux)	Cut-off Frequency (kHz)	Tj max. (°C)	V_R max. (V)	I_R max. (mA)
BPX40	0·8	1·1	Unencapsulated silicon planar photodiodes for general purpose applications.	AX	0·5 at 15V	0·0105	—	125	18	2
BPX41	0·8	1·1		AX	1·0 at 15V	0·031	—	125	18	5
BPX42	0·8	1·1		AY	5·0 at 10V	0·120	—	125	12	20
BPX94	0·8	1·1	Silicon photodiode for low light level applications	J2	0·1nA	0·008	—	150	18	—
BPY13	0·9	1·1	Silicon photodiode for high-speed applications	[d]H6	1·0	0·25[a] μA/μW	10 MHz	—	50	—
BPY13A	0·9	1·1	Silicon photodiode for ultra high speed applications	[d]H6	2·0	0·25[a] μA/μW	300 MHz	—	100[b]	—
BPY69	0·9	1·1	Silicon n-p-n duo-photodiodes for use in photoconductive mode	AK2	0·05	0·2	—	125	60	10
BPY77	0·8	1·1	Silicon photodiode for ultra high speed applications	G5	0·002 at 10V	0·035 typ	—	200	100	40
OAP12	1·55	1·8	Germanium photodiode for use in photoconductive† mode	AK1	15	0·05[c]	50	60	30	3·0

[a]With monochromatic light, at 0·9μm. Measured with a gallium arsenide diode type CQY11

[b]Typical operating voltage (depletion voltage)

[c]AT 25°C. V_R = 10V and 800 lux from 2700K source

†i.e. Reverse biased

[d]H6 is 2-lead TO–5 with end window.

electroluminescent diodes

Ga As diodes emitting near infrared radiation for use in optical transmission of information, optoelectronic couplings and monochromatic sources

Type No.	Peak Spectral Response (μm)	Description and Construction		I_{FRM} max. (mA)	I_F max. (mA)	P/I min. (mW/A)	t_r typ. (ns)	T_j Temperature Range (°C)
CQY11B	0·875	Ga As diode in modified TO–18 encapsulation with plane window	G4	200	30	3·0	100	−55 +150
CQY11C	0·875	Ga As diode in modified TO–18 encapsulation with lensed window	G4	200	30	3·0	100	−55 +150
CQY50	0·93	Ga As diode in subminiature encapsulator with lensed window	CB	500	100	8·0	500	−65 +150

Photodevices
visible (red) electroluminescent diodes and displays

book 1 part 3

Type No.	Peak Spectral Response (μm)	Description and Construction		I_F max. (mA)	V_F max. (V)	Luminance (at 20mA) typ. (cd/m²)	T_j max. (°C)
CQY24* **CQY46†** **CQY47‡**	0·65	Diffused red plastic encapsulated GaAsP light emitting diode for general use i.e. panel warning light, logic-state indicator	CA	50	2	500	100
185CQY (CQY25)	0·65	Seven segement GaAsP numerical indicator encapsulated in red epoxy package	BE	10 (per segment) 80 (per device)	2	680 (I_F=5mA)	85

*Available with plastic panel mounting clip type RTC757 (black) or RTC758 (colourless).
†As CQY24 but in clear red plastic.
‡As CQY24 but in clear colourless plastic.

solid-state photo relays

Type No.	Description and Construction		I_C/I_F typ. I_F=8mA	I_F (max.) (mA)	Minimum Isolation Voltage(pk) (V)	t_r (typ.) (μs)	t_f (typ.) (μs)
CNY22	Solid-state photorelays consisting of a GaAs electro-luminescent diode and a silicon n-p-n photo-transistor	BN	0·5	30	4000	5	5
CNY23		BN	1·0	30	2800	5	5
CNY42		BN*	0·5	30	4000	5	5
CNY43		BN*	1·0	30	2800	5	5
CNY44		T1	0·6†	30	1500	2	2
CNY46		T2	0·6†	30	1500	2	2

*4-pin configuration †I_F = 10mA

pyro-electric detectors

Type No.	Typ. Noise Equivalent Power (500K, 90, 1) (W)	Typical Detectivity D* (λpk, 800, 1) cm(Hz)½/W	Wavelength Range (μm)	Typical Responsivity (V/W)	Frequency Range	Sensitive Area (mm)
802CPY	$1·5\times10^{-9}$	$1·2\times10^{8}$	2–25	1×10^{3}	10Hz–100kHz	2·0 diam.
825CPY	(500K, 10, 1) 3×10^{-10}	D* (500K, 10, 1) 6×10^{8}	2–25	2×10^{5}	5Hz–50Hz	3×1

Photodevices
infrared photoconductive detectors book 2 part 2

Type No.	Spectral Response Peak (μm)	Spectral Response Cut-off (μm)	Description and Construction		Typical Detectivity D*(λpk,800,1) cm(Hz)½/W	Typical Monochromatic Responsivity (V/W)	Typical Time Constant (μs)	Sensitive Area (mm)	Element Resistance (kΩ)
RPY75	1·5 to 2·1	2·6	Lead sulphide detectors for room temperature operation	AL	$2{\cdot}0\times10^{10}$	5×10^{5}	250	1·0×1·0	> 200
RPY75A			RPY75A incorporates a germanium filter to cut off visible radiations						
RPY76	1·5 to 2·1	2·6	Lead sulphide detectors for room temperature operation	[a]H5	$2{\cdot}0\times10^{10}$	5×10^{5}	250	1·0×1·0	> 200
RPY76A			RPY76A incorporates a germanium filter to cut off visible radiations						
61SV	2·2	3·5	Lead sulphide detector for room temperature operation	AM	$4{\cdot}0\times10^{10}$	8×10^{4}	100	6·0×6·0	1 to 4MΩ
62SV	2·5	3·5	Lead sulphide detector for room temperature operation	AM	$6{\cdot}0\times10^{10}$	$1{\cdot}2\times10^{5}$	175	6·0×6·0	1 to 4MΩ
ORP13	5·3	5·6	Indium antimonide detector for liquid N_2 temperature 77K operation	AN	$5{\cdot}5\times10^{10}$	$3{\cdot}5\times10^{4}$	5	6·0×0·5	20 to 60
RPY31	5·3	5·6	Indium antimonide detector for liquid N_2 temperature 77K operation	AN	$4{\cdot}0\times10^{10}$	$2{\cdot}6\times10^{3}$	5	4·0×4·0	1 to 5
RPY35	5·3	5·6	Indium antimonide detector for liquid N_2 or miniature Joule-Thompson coolers	BA	$4{\cdot}0\times10^{10}$	$2{\cdot}6\times10^{3}$	5	4·0×4·0	1 to 5
RPY51	5·3	5·6	Indium antimonide detectors for 77K operation using liquid N_2 or miniature Joule-Thompson coolers	BA	$9{\cdot}0\times10^{10}$	$4{\cdot}5\times10^{4}$	2·5	0·5×0·5	1·2 to 3·5
RPY52					$5{\cdot}0\times10^{10}$				
ORP10	6 to 6·3	7·5	Indium antimonide detector for room temperature operation	AO	$2{\cdot}0\times10^{8}$	1·0	0·1	6·0×0·5	30 to 120Ω
RPY77	6 to 6·3	7·5	Indium antimonide labyrinth detectors for room temperature operation	BB	$>1\times10^{8}$	5·0	< 0·1	2×2	0·5 to 1·5
RPY78	6 to 6·3	7·0†		BB	$>9{\cdot}5\times10^{7}$	5·0	< 0·1	2×2	0·5 to 1·5

[a]H5 (TO–5 with end window) connections as follows: 1 and 2 Cell connections 3 Metal case
† Limited spectral response due to sapphire window

Photodevices

cadmium sulphide photoconductive cells book 2 part 2

All types: Spectral response range 0·3 to 0·9μm

Type No.	Incidence of Illumination	Max. Dissipation (mW)	at (°C)	Max. Cell Voltage (d.c. or pk.) (V)	Nominal* Cell Resistance (kΩ)	Ambient Temperature Limits (°C)	Base
ORP12	End-on	200	25	110	2·4	−10 to +60	Wired-in
ORP52	Side-on and End-on	400	25	200	1·2	−40 to +70	Wired-in
ORP60	End-on	70	25	350	60	−40 to +70	Wired-in
ORP61	Side-on	70 20	25 70	350	60	−40 to +70	Wired-in
ORP62	Side-on	100	25	350	45	−40 to +70	Wired-in
ORP69	Side-on and End-on	100	25	350	30	−40 to +70	Wired-in
ORP90	Side-on	1000 300	25 70	350	1·0	−40 to +70	B7G
ORP93	Side-on	1000 350	25 70	400	1·7	−40 to +70	B7G
RPY30	Side-on	200	25	150	1·6	−30 to +60	Wired-in
RPY33	End-on (Cadmium sulpho-selenide)	75	25	50	2·5 (at 25 lux)	−40 to +60	Wired-in
RPY58A	Side-on (Monograin)	100	25	50	0·6	−40 to +60	Wired-in
RPY71	Side-on (Linear monograin)	50	25	50	3·0 to 6·0 (at 10 lux)	−40 to +70	Wired-in
RPY82	Side-on (Lacquer coated)	300	25	100	0·95	−40 to +70	Wired-in

*Measured at 50 lux and with lamp of colour temperature 2700K.

Microwave solid state mixer diodes book 1 part 3

Type No.	Description	Construction	Maximum Operating Frequency (GHz)	Typical Noise Figure (dB)	Leakage Current at V_R=0·5V (μA)	Forward Current at V_F=0·5V (mA)	Typical Impedance Z_{if} (Ω)	Operating Temperature (°C)
AAY34	Germanium sub-miniature diodes for use in Q band	AH	40	8·5	10	2·0	750	−55 to +100
AAY39 (CV7762) **AAY39A**	Germanium sub-miniature diode for use in X band	AH	18	6·0 7·0	3·0	5·0	350	−55 to +100
AAY50 (CV7838) **AAY50R*** (CV7839)	Germanium diode for use in X band	X	12	6·2	3·0	9·0	400	−55 to +100
AAY51 (CV7776) **AAY51R*** (CV7777)	Germanium diode for use in J band	AZ	18	7·0	3·0	9·0	270	−55 to +100
AAY52 **AAY52R***	Germanium diode for use in J band	AZ	18	8·0	3·0	9·0	270	−55 to +100
AAY56 **AAY56R***	Germanium diode for use in S band		4	6·5	3·0	9·0	450	−55 to +100
AAY59	Germanium Q band diode	AH	40	8·5	2·0	2·0	1000	−55 to +100

*Reverse polarity version.

Schottky barrier mixer diodes

Type No.	Construction	Maximum Operating Frequency (GHz)	Typical Noise Figure (dB)	Typical Impedance Z_{if} (Ω)	Operating Temperature (°C)
BAT10	CE	12	7·0	600	−55 to +150
BAT11	AE	12	6·5	320	−55 to +150
BAV22 **BAV22R***	X	12	7·0	425	−55 to +100
BAV71	AH	40	10**	1050	−55 to +150
BAV72	M	40	10**	1050	−55 to +150
BAV96A **BAV96B** **BAV96C** **BAV96D**	M	12	7·5 7·0 6·5 6·0	300	−55 to +150
BAW95D **BAW95E** **BAW95F** **BAW95G**	BO	12	7·8 7·2 6·8 6·3	415	−55 to +150

*Reverse polarity version. **Maximum.

Microwave solid state
Schottky barrier detector diodes book 1 part 3

Type No.	Description	Construction	Frequency Range (GHz)	Typical Tangential Sensitivity (dbm)	Typical 1/f noise (dB)	Typical Video Impedance (Ω)
BAV46	Schottky barrier diode for use in X band Doppler radar systems	BO	1 to 12	−52	10	850
BAV75	Schottky barrier diode for low level detector applications	C	1 to 12	−50	10	325
BAV97	Schottky barrier diode for low level detector applications diode for use up to Q band	M	1 to 12	−54	10	500

backward diodes

Type No.	Description	Construction	Frequency Range (GHz)	Typical Tangential Sensitivity (dbm)	Min. Figure of Merit	Typical Video Impedance (Ω)
AEY17	Germanium bonded backward diode for use at X band	AH	1 to 18	−53	120*	300
AEY29 **AEY29R****	Germanium bonded backward diode for use at J band	AZ	12 to 18	−53	50†	300
AEY31 **AEY31A**	Subminiature germanium bonded backward diode for use up to J band	M	1 to 18 1 to 18	−53 −50	120* 50*	300 300
AEY32	Subminiature germanium bonded backward diode for use up to Q band	M	18 to 40	—	50	4000

*Measured at 9·375GHz. **Reverse polarity version. †Measured at 16·5GHz in JAN 201 holder.

Gunn effect devices

Type No.	Description	Construction	Operating Voltage (V)	Frequency Range (GHz)	Pout (typ.) (mW)	Ptot Max. (25°C) (W)
CXY11A **CXY11B** **CXY11C**	Ga As bulk effect devices employing the Gunn effect to produce c.w. oscillations in X band	C	7·0	8 to 12	8·0 12 15	1·0
CXY14A **CXY14B** **CXY14C**	Ga As bulk effect devices employing the Gunn effect to produce c.w. oscillations in J band	C	7·0	12 to 18	8·0 12 20	1·0
CXY16D **CXY16E** **CXY16F**	Ga As bulk effect devices employing the Gunn effect to produce c.w. oscillations in X band	C	8·0	8 to 12	200 300 400	9·0 10 11
CXY17A **CXY17B** **CXY17C** **CXY17D** **CXY17E**	Ga As bulk effect devices employing the Gunn effect to produce c.w. oscillations in C band	C	10	4 to 8	50 75 100 200 300	6·0 8·0 10 11 12
CXY18A **CXY18B** **CXY18C** **CXY18D** **CXY18E**	Ga As bulk effect devices employing the Gunn effect to produce c.w. oscillations in J band	C	6·0	12 to 18	50 75 100 200 300	4·0 6·0 8·0 10 11
CXY19	Ga As bulk effect device employing the Gunn effect to produce c.w. oscillations in X band	C	12	8 to 12	150	6·0
CXY21	Ga As bulk effect device employing the Gunn effect to produce c.w. oscillations in X band	C	9·5	8 to 12	60	2·5

Microwave solid state multiplier varactor diodes book 1 part 3

Type No.	Description and construction		Capacitance at V_R (pF)	(V)	V_R max. (V)	Maximum Transit Time (ps)	Typical Cut-off Frequency (GHz)
BAY96	Silicon planar diode for use in high efficiency multiplier circuits, input powers up to 30W	E1	16 35	40 6	120	—	25
BXY27	Silicon planar epitaxial varactor diode for use in multipliers up to S band and input powers up to 10W	C	4·5	6	55	—	70
BXY28	Silicon planar epitaxial varactor diode for use in high efficiency multipliers in the 2 to 4 GHz range	C	1·5	6	45	—	100 min.
BXY29	Silicon planar epitaxial varactor diode for use in frequency multiplier circuits in the 4 to 8 GHz range	C	1·0	6	25	—	120
BXY32	Silicon planar step recovery diode for high order frequency multipliers with outputs in X band	C	0·75	6	20	150	150
BXY35	Silicon planar epitaxial varactor diodes for frequency multipliers up to 18 GHz, available in a variety of outlines	E1, N	9	6	100	—	25
BXY36		C, N, Z	5	6	70	500	75
BXY37		C, N, Z	3	6	70	350	100
BXY38		C, N, Z, O	1·6	6	50	300	120
BXY39		C, N, Z, O	1·0	6	40	200	150
BXY40		C, N, Z, O	0·65	6	25	150	180
BXY41		C, N, Z, O	0·4	6	25	100	200
BXY56	High efficiency silicon diodes for multipliers with output frequencies in C and X bands	C	2·0	6	60	—	160
BXY57			3·0	6	60	—	140
1N4885	Silicon varactor diode for use in high efficiency multiplier circuits	E1	35	6	150	—	25
1N5152	Silicon planar epitaxial varactor diodes for use in multipliers up to S band	C	6	6	75	—	100
1N5153		N	6	6	75	—	100
1N5155	Silicon planar epitaxial varactor diode for use in multipliers up to C band	C	2	6	35	—	120
1N5157	Silicon planar epitaxial varactor diode for use in multipliers up to X band	C	0·8	6	20	—	200

tuning varactor diodes

Type No.	Description and construction		Capacitance min. (pF)	max. (pF)	at V_R (V)	V_R max. (V)
BXY53	Silicon planar epitaxial tuning devices	C	0·8	1·2	4	60
BXY54			3·7	5·7	4	60
BXY55			12	18	4	60

special purpose varactor diodes

Type No.	Description and construction		Capacitance at V_R (pF)	(V)	V_R max. (V)	Series Resonant Frequency (GHz)	Typical Cut-off Frequency (GHz)
CAY10	Gallium arsenide diode, diffused mesa type, for use in microwave parametric amplifiers, frequency multipliers and switches	C	0·4	0	6	10	250
CXY10	Gallium arsenide diode with a high cut-off frequency for use in parametric amplifiers, frequency multipliers and switches	L	0·2	0	6	30	400
CXY12	Gallium arsenide diode with a high cut-off frequency for use in frequency multipliers up to Q band	L	0·25	6	10	29	500

impatt diodes

Type No.	Description and construction		Frequency Range (GHz)	Power Output (min.) (mW)	Operating Voltage (V)
BXY50	High power diodes for use as oscillators or negative resistance amplifiers	O	8 to 10	500	90
BXY51			10 to 12	400	80
BXY52			12 to 14	300	70

Diodes

germanium point contact diodes book 1 part 3

Abridged data applying at 25°C T_{amb}

Type No.	Description and Construction		V_{RRM} (V)	I_{FRM} (mA)	$I_{F(AV)}$ (mA)	Typical V_F at I_F (V)	(mA)	Typical I_R at V_R (μA)	(V)	T_{amb} max. (°C)
OA90	Subminiature high frequency detector diode	A1	30	45	10	2·0	30	300	30	75
AA119	Detector diode	A1	45	100	35	2·6	30	170	45	60
OA91	Subminiature general purpose diode	A1	115	150	50	2·1	30	75	100	75
OA95	Subminiature general purpose diode	A1	115	150	50	1·85	30	80	100	75

germanium gold bonded diodes

Type No.	Description and Construction		V_{RRM} (V)	I_{FRM} (mA)	Typical V_F at I_F (V)	(mA)	Typical I_R at V_{RRM} (μA)	Q_S (pC)	Typical Recovered Charge Measured at: I_F (mA)	V_R (V)	R_L (Ω)
AAZ13	High speed switching	A1	8	100	0·6	30	30	20	10	5	500
AAY33		A1	12	240	0·5max.	30	15	60	10	10	1000
AAY32		A1	30	150	0·60max.	30	11	100	10	10	1000
OA47	General purpose	A1	30	150	0·54	30	10	280	10	10	1000
AAY30	High speed switching	A1	30	400	0·88	150	8·0	250	10	10	1000
AAZ17	General purpose	A1	75	250	0·8	250	60	300	10	10	1000
AAZ15	High voltage	A1	100	250	0·8	250	16	750	10	10	1000

silicon junction diodes

Abridged data applying at 25°C T_{amb}

Type No.	Description and Construction		V_{RRM} (V)	I_{FRM} (mA)	$I_{F(AV)}$ (mA)	V_F max. at I_F (V)	(mA)	Typical I_R at max. V_{RRM} (μA)
OA200	General purpose diode	A1	50	250	80	1·15	30	0·02
OA202	General purpose diode	A1	150	250	80	1·15	30	0·01

silicon whiskerless diodes

Type No.	Description and Construction		V_{RRM} (V)	I_{FRM} (mA)	$I_{F(AV)}$ (mA)	C_d (pF)	V_F max at I_F (V)	(mA)	t_{rr} (ns)	Max. Reverse Recovery Time Measured at: I_F (mA)	V_R (V)	R_L (Ω)	I_R (mA)
BA314	Low voltage stabiliser	B1	—	250	—	<140	0·96	100	—	—	—	—	—
BA316	10V, 30V and 50V general purpose diodes	B1	10	225	100	3	1·1	100	4	10	6	100	1
BA317		B1	30	225	100	3	1·1	100	4	10	6	100	1
BA318		B1	50	225	100	3	1·1	100	4	10	6	100	1
BAV10	High speed diode for core gating applications in very fast memories	B1	60	600	300	2·5	1·0	200	6·0	400	—	100	40
BAV18	General purpose switching diodes	B1	60	625	200	5·0	1·25	200	50	30	—	100	3
BAV19		B1	120	625	200	5·0	1·25	200	50	30	—	100	3
BAV20		B1	180	625	200	5·0	1·25	200	50	30	—	100	3
BAV21		B1	250	625	200	5·0	1·25	200	50	30	—	100	3
BAV44	High speed, high current diode for servo-amplifiers, digital voltmeters and oscilloscopes	AQ2	65	3·5A	1A	7·5	0·9	100	20	1A	—	50	1A

Diodes
silicon whiskerless diodes (cont.) book 1 part 3

Type No.	Description and Construction		V_{RRM} (V)	I_{FRM} (mA)	$I_{F(AV)}$ (mA)	C_d max. (pF)	V_F max. (V)	at I_F (mA)	t_{rr} (ns)	Max. Reverse Recovery Time Measured at: I_F (mA)	V_R (V)	R_L (Ω)	I_R (Am)
BAV45	Extremely low leakage and low capacitance diode (I_R = 10pA at V_R = 20V)	G5	35	100	50	1·3	1·0	10	250	10	1	100	1·0
BAW62	High speed diode for fast logic applications	B1	75	225	100	2·0	1·0	100	4·0	10	1·0	100	1·0
BAX12	Controlled avalanche diode avalanche voltage 120–175V at 1mA	AQ1	90	800	400	35	1·0	200	60	30	3	100	1·0
BAX13	High speed diode intended for logic application	AQ1	50	150	75	—	1·0	20	4	10	6	100	1·0
BAX16	Intended for general purpose industrial applications	AQ1	150	300	200	10	1·3	100	120	30	3	100	1·0
BAX17	Intended for general purpose industrial applications	AQ1	200	300	200	10	1·2	200	120	30	3	100	1·0
1N914	High speed diodes for computer	AQ1	100	225	75	4·0	1·0	10	4·0	10	6·0	100	1·0
1N916	High speed diodes for computer and other applications	AQ1	100	225	75	2·0	1·0	10	4·0	10	6·0	100	1·0
1N4009	Ultra high speed diode	AQ1	25	—	—	4·0	1·0	30	2·0	10	6·0	100	1·0
Abridged data applying at 25°C T_{amb}													
1N4148	High speed diodes for computer and other applications	B1	75	225	75	4	1·0	10	4	10	6	100	1·0
1N4149		B1	100	225	75	2	1·0	10	4	10	6	100	1·0
1N4446		B1	75	450	150	4	1·0	20	4	10	6	100	1·0
1N4448		B1	75	450	150	4	1·0	100	4	10	6	100	1·0

variable capacitance diodes

Type No.	Description and Construction		V_R max. (V)	I_R max. (μA)	C_d at V_R (pF) min.	C_d at V_R (pF) max.	(V)	Capacitance Ratio min.	Capacitance Ratio max.
BA102	Intended for a.f.c. control in TV receivers	A1	20	5	20 (4 groups)	45	4·0	1·4	—
BA182	Band switching v.h.f. TV	BV	35	0·1	0·6	1·0	20	—	—
BB105B	Intended for u.h.f. tuners	BV	28	0·1	2·0	2·3	25	4·5	6·0
BB105G	Intended for v.h.f. tuners	BV	28	0·1	1·8	2·8	25	4·0	6·0
BB110	Silicon planar variable capacitance diode for tuning in band II f.m. and for r.f. and interstage circuits	BV	30	0·02	27 (2 groups)	33	3·0	2·65 typ.	
BB113	Silicon planar variable capacitance triple diode for tuning in LW, MW and SW-bands of a.m. radio receivers	BW	32	0·05	230	280	1·0	13pF max. at 30V	

Diodes

fast recovery low power rectifier diodes book 1 part 3

Type No.	Description and Construction		V_{RRM} (V)	I_{FSM} (A)	$I_{F(AV)}$ (mA)	V_F max. at I_F (V)	(I_F) (A)	Q_S max. (nC)	Max. recovered charge Measured at: I_F (mA)	V_R (V)	$-di/dt$ (mA/μs)
BY206	Fast soft recovery diode	A3	350	15	400	1·5	2·0	60	400	⩾50	400
BY207	Fast soft recovery diode	A3	600	15	400	1·5	2·0	60	400	⩾50	400
BY210–400	Fast soft recovery diode	A3	400	30	—	1·3	1·0	60	400	⩾50	400
–600	Fast soft recovery diode	A3	600	30	—	1·3	1·0	60	400	⩾50	400
BYX70–100	High speed diodes	B2	100	30	1·0	1·2	1·0	0·9	10	2·0	5·0
–300	for use in inverters		300								
–500	and similar applications		500								

low power silicon rectifier diodes

Type No.	Description and Construction		V_{RRM} (V)	I_{FSM} (A)	$I_{F(AV)}$ (A)	V_F max. at I_F (V)	(I_F) (A)	I_R max. at V_{RRM} (μA)
BYX26–60 (CV8308)	Controlled avalanche rectifier diodes	A2	60	7·0	0·25	0·9	0·25	1·0
BYX26–150 (CV8805)			150					
BYX36–150	Intended for general purpose	A2	150	30	1	1·1	1	1·0
–300	industrial applications		300					
–600			600					
1N4001 to 1N4007	General purpose rectifier diodes	B2	50 to 1000	30	1	1·1	1	10

silicon voltage reference diodes

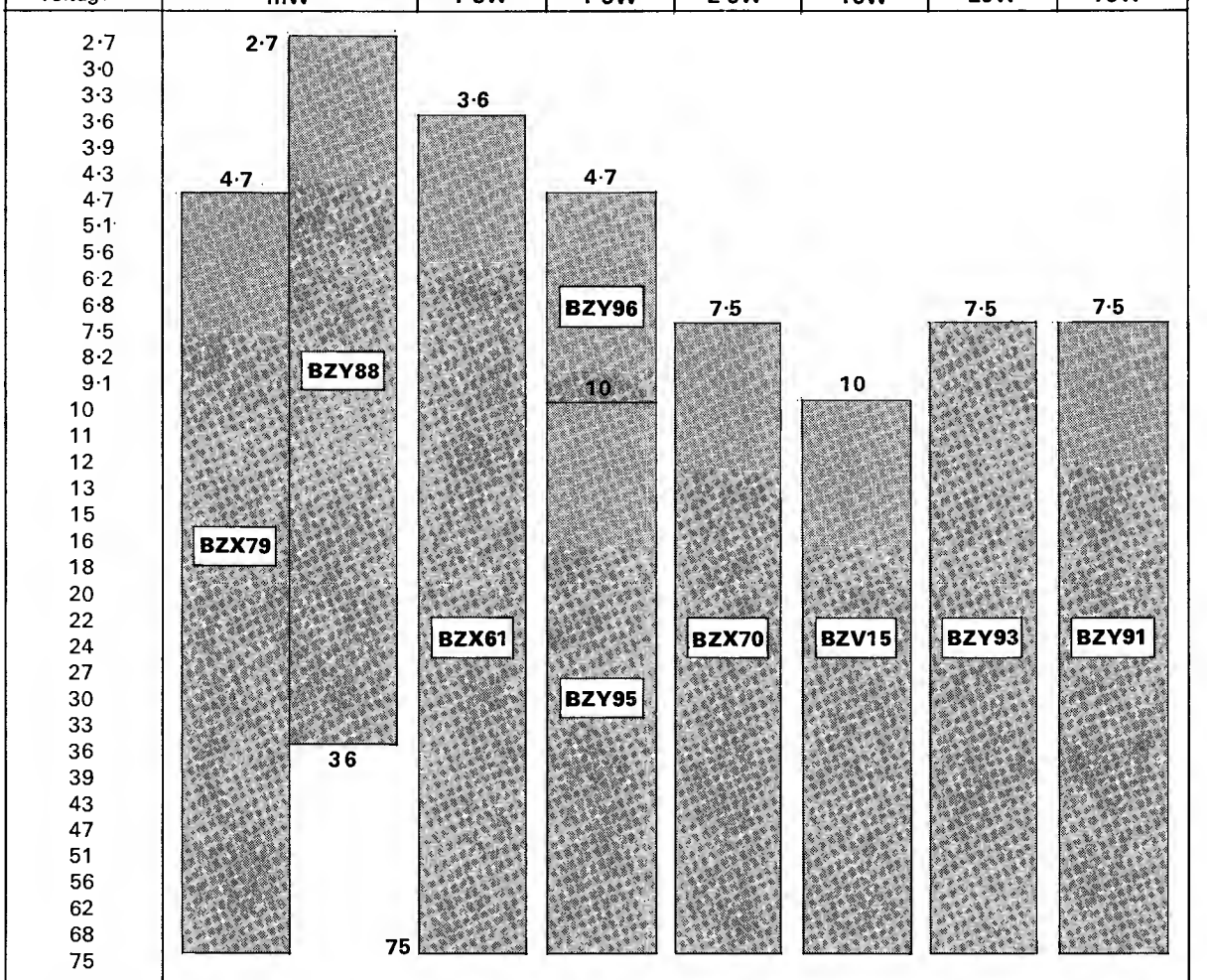
Type No.	Construction	Zener Voltage (at test I_Z) (V) Min.	Max.	Typical Temperature Coefficient (%/°C)	Ambient Temperature Range (°C) Min.	Max.	Max. Dynamic Resistance (at test I_Z) (Ω)	Test I_Z (mA)	I_{ZM} max. (mA)	P_{tot} max. (mW)
BZV10	B1	6·2	6·8	±0·01	0	+70	50	2	50	400
BZV11				±0·005						
BZV12				±0·002						
BZV13				±0·001						
BZV14				±0·0005						
BZX90	B1	6·2	6·8	±0·01	−55	+100	15	7·5	50	400
BZX91				±0·005						
BZX92				±0·002						
BZX93				±0·001						
BZX94				±0·0005						
BZY78	A1	5·1	5·6	+0·006	−40	+25	20	11·5	25	400
				−0·004	+25	+100				
BZY78P	A1	5·1	5·6	±0·01	0	+80	20	11·5	25	400
1N821	B1	5·8	6·5	±0·01	−55	+100	15	7·5	50	400
1N823				±0·005						
1N825				±0·002						
1N827				±0·001						
1N829				±0·0005						

Diodes

silicon voltage regulator diodes book 1 part 3

selector chart

Voltage Regulator Diodes Selector Chart



Encapsulation	DO-35	DO-7	DO-15	DO-1	SO-15	Plastic	DO-4	DO-5
Polarity	Norm.	Norm.	Norm.	Norm.	Norm.	Both	Both	Both
Rated diss. at Temp.	50°C amb.	50°C amb.	25°C amb.	25°C amb.	25°C amb.	60°C hs	75°C stud	65°C stud

SO-SWIFT and "SELECT" SERVICE

This service is applicable to the BZX61, BZX79 and BZY88 ranges.
The following parameters can be specially selected:—

V_Z At any specified current within the rating of the device as specified in the main data. This voltage can be chosen between 3·6 and 75V for the BZX61 range, between 4·7 and 75V for the BZX79 range, and between 2·7 and 36V for the BZY88 range.
The voltage tolerance can be selected down to ±1%.

r_Z At any specified current within the rating of the device as specified in the main data. The slope resistance value can be specified down to 50% of the maximum value quoted for the standard device.

I_R At any specified voltage up to 95% of the nominal V_Z for the device measured at 5mA.

V_F To customers requirements.
The scope of this and obviously all other parameters is determined by the overall capabilities of the product.

Markings Any form of type marking can be supplied.

Diodes
silicon voltage regulator diodes (cont.) book 1 part 3

400mW (T_{amb} = 50°C) ± 5% voltage tolerance, construction B1

Type No. BZX79	Nom. Zener Voltage (V)	Measured at Test I_Z Min. Voltage (V)	Measured at Test I_Z Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (mV/°C)	Test I_Z (mA)	Max. I_R at V_R (μA)	Max. I_R at V_R (V)
—C4V7	4·7	4·4	5·0	80	−1·4	5·0	3·0	2·0
—C5V1	5·1	4·8	5·4	60	−0·8	5·0	2·0	2·0
—C5V6	5·6	5·2	6·0	40	+1·2	5·0	1·0	2·0
—C6V2	6·2	5·8	6·6	10	+2·3	5·0	3·0	4·0
—C6V8	6·8	6·4	7·2	15	+3·0	5·0	2·0	4·0
—C7V5	7·5	7·0	7·9	15	+4·0	5·0	1·0	5·0
—C8V2	8·2	7·7	8·7	15	+4·6	5·0	0·7	5·0
—C9V1	9·1	8·5	9·6	15	+5·5	5·0	0·5	6·0
—C10	10	9·4	10·6	20	+6·4	5·0	0·2	7·0
—C11	11	10·4	11·6	20	+7·4	5·0	0·1	8·0
—C12	12	11·4	12·7	25	+8·4	5·0	0·1	8·0
—C13	13	12·4	14·1	30	+9·4	5·0	0·1	8·0
—C15	15	13·8	15·6	30	+11·4	5·0	0·05	10·5
—C16	16	15·3	17·1	40	+12·4	5·0	0·05	11·2
—C18	18	16·8	19·1	45	+14·4	5·0	0·05	12·6
—C20	20	18·8	21·2	55	+16·4	5·0	0·05	14
—C22	22	20·8	23·3	55	+18·4	5·0	0·05	15·4
—C24	24	22·7	25·6	70	+20·4	5·0	0·05	16·8
—C27	27	25·1	28·9	80	+23·5 max.	2·0	0·05	18·9
—C30	30	28	32	80	+26 max.	2·0	0·05	21·0
—C33	33	31	35	80	+29 max.	2·0	0·05	23·1
—C36	36	34	38	90	+31 max.	2·0	0·05	25·2
—C39	39	37	41	130	+34 max.	2·0	0·05	27·4
—C43	43	40	46	150	+37 max.	2·0	0·05	30·1
—C47	47	44	50	170	+40 max.	2·0	0·05	33·0
—C51	51	48	54	180	+44 max.	2·0	0·05	35·7
—C56	56	52	60	200	+47 max.	2·0	0·05	39·3
—C62	62	58	66	215	+51 max.	2·0	0·05	43·5
—C68	68	64	72	240	+56 max.	2·0	0·05	47·7
—C75	75	70	79	255	+60 max.	2·0	0·05	52·5

400mW (T_{amb} = 50°C) ±5% voltage tolerance, construction A1

‡BZY88								
—C1V3*	1·3	1·24	1·44	15**	−3·7	5·0	0·5	5·0
—C2V7	2·7	2·5	2·9	120	−2·2	5·0	25	1·0
—C3V0	3·0	2·8	3·2	120	−2·4	5·0	5·0	1·0
—C3V3	3·3	3·1	3·5	110	−2·4	5·0	3·0	1·0
—C3V6	3·6	3·4	3·8	105	−2·0	5·0	3·0	1·0
—C3V9	3·9	3·7	4·1	100	−2·05	5·0	3·0	1·0
—C4V3	4·3	4·0	4·6	90	−1·8	5·0	3·0	1·0
—C4V7	4·7	4·4	5·0	85	−1·55	5·0	3·0	2·0
—C5V1	5·1	4·8	5·4	75	−1·2	5·0	1·0	2·0
—C5V6	5·6	5·3	6·0	55	−0·2	5·0	1·0	2·0
—C6V2	6·2	5·8	6·6	27	+2·0	5·0	1·0	2·0
—C6V8	6·8	6·4	7·2	15	+3·2	5·0	1·0	3·0
—C7V5	7·5	7·0	7·9	15	+4·2	5·0	0·5	3·0

‡available to BS9305–NO41. *Forward voltage regulator diode. **typical

Diodes

silicon voltage regulator diodes (cont.) book 1 part 3

400mW (T_{amb} = 50°C) ±5% voltage tolerance, construction A1

Type No. ‡BZY88 (cont)	Nom. Zener Voltage (V)	Measured at Test I_Z Min. Voltage (V)	Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (mV/°C)	Test I_Z (mA)	Max. I_R at V_R (μA)	(V)
—C8V2	8·2	7·7	8·7	20	+5·0	5·0	0·4	3·0
—C9V1	9·1	8·5	9·6	25	+6·0	5·0	0·4	5·0
—C10	10	9·4	10·6	25	+7·0	5·0	2·5	7·0
—C11	11	10·4	11·6	25	+8·7	5·0	2·5	7·0
—C12	12	11·4	12·7	35	+9·0	5·0	2·5	8·0
—C13	13	12·4	14·1	35	+10·5	5·0	2·5	9·0
—C15	15	13·8	15·6	35	+12·5	5·0	2·5	10
—C16	16	15·3	17·1	40	+13	5·0	2·5	10
—C18	18	16·8	19·1	45	+15	5·0	2·5	13
—C20	20	18·8	21·2	50	+17	5·0	2·5	14
—C22	22	20·8	23·3	60	+19	5·0	2·5	15
—C24	24	22·7	25·9	75	+21	5·0	2·5	17
—C27	27	25·1	28·9	85	+23·5	5·0	2·5	19
—C30	30	28	32	95	+26	5·0	2·5	21
—C33	33	31	35	120	+28	5·0	2·5	23
—C36	36	34	38	150	+30	5·0	2·5	25

‡also available to BS9305—NO41 1N748A to 1N759A are also available

1.3W (T_{amb} = 25°C) ±5% voltage tolerance, construction B2

Type No. BZX61	Nom. Zener Voltage (V)	Measured at Test I_Z Min. Voltage (V)	Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (%/°C)	Test I_Z (mA)	Max. I_R at V_R (μA)	(V)
—C3V6	3·6	3·4	3·8	20	−0·6	50	30	1·0
—C3V9	3·9	3·7	4·1	20	−0·5	50	20	1·0
—C4V3	4·3	4·0	4·6	15	−0·4	50	20	1·0
—C4V7	4·7	4·4	5·0	15	−0·25	50	20	1·0
—C5V1	5·1	4·8	5·4	10	−0·1	50	10	1·0
—C5V6	5·6	5·2	6·0	5·0	+0·005	50	5·0	2·0
—C6V2	6·2	5·8	6·6	5·0	+0·015	50	5·0	2·0
—C6V8	6·8	6·4	7·2	5·0	+0·03	50	5·0	2·0
—C7V5	7·5	7·0	7·9	5·0	+0·04	20	5·0	3·0
—C8V2	8·2	7·7	8·7	7·5	+0·04	20	5·0	3·0
—C9V1	9·1	8·5	9·6	8·0	+0·05	20	5·0	5·0
—C10	10	9·4	10·6	8·5	+0·05	20	5·0	7·0
—C11	11	10·4	11·6	9·0	+0·05	20	5·0	7·0
—C12	12	11·4	12·7	9·0	+0·05	20	5·0	8·0
—C13	13	12·4	14·1	10	+0·05	20	5·0	9·0
—C15	15	13·8	15·6	14	+0·06	20	5·0	10
—C16	16	15·3	17·1	16	+0·06	10	5·0	11
—C18	18	16·8	19·1	20	+0·06	10	5·0	13
—C20	20	18·8	21·2	22	+0·06	10	5·0	14
—C22	22	20·8	23·3	23	+0·06	10	5·0	15
—C24	24	22·7	25·9	25	+0·06	10	5·0	17
—C27	27	25·1	28·9	35	+0·06	10	5·0	19
—C30	30	28	32	40	+0·07	10	5·0	21
—C33	33	31	35	45	+0·07	10	5·0	23
—C36	36	34	38	50	+0·07	10	5·0	25
—C39	39	37	41	60	+0·07	5	5·0	27
—C43	43	40	46	70	+0·07	5	5·0	30
—C47	47	44	50	80	+0·08	5	5·0	33
—C51	51	48	54	95	+0·08	5	5·0	36
—C56	56	52	60	105	+0·08	5	5·0	39
—C62	62	58	66	110	+0·08	5	5·0	43
—C68	68	64	72	120	+0·08	5	5·0	48
—C75	75	70	79	135	+0·08	5	5·0	52

Diodes

silicon voltage regulator diodes (cont.) book 1 part 3

1·5W (T_{amb} = 25°C) ±5% voltage tolerance, construction Q2

Type No. BZY96	Nom. Zener Voltage (V)	Measured at Test I_Z Min. Voltage (V)	Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (mV/°C)	Test I_Z (mA)	Max. I_R at V_R (μA)	(V)
—C4V7	4·7	4·4	5·0	10	−0·6	100	20	1·0
—C5V1	5·1	4·8	5·4	5·0	−0·4	100	20	1·0
—C5V6	5·6	5·2	6·0	4·0	+1·0	100	20	1·0
—C6V2	6·2	5·8	6·6	3·0	+2·0	100	20	2·0
—C6V8	6·8	6·4	7·2	3·0	+3·0	100	20	2·0
—C7V5	7·5	7·0	7·9	3·5	+4·0	50	20	3·0
—C8V2	8·2	7·7	8·7	3·5	+5·0	50	20	5·6
—C9V1	9·1	8·5	9·6	4·5	+6·4	50	20	6·2
—C10	10	9·4	10·6	5·0	+8·0	50	20	6·8
BZY95								
—C10	10	9·4	10·6	4·0	+7·0	50	10	6·8
—C11	11	10·4	11·6	4·5	+7·5	50	10	7·5
—C12	12	11·4	12·7	5·0	+8·0	50	10	8·2
—C13	13	12·4	14·1	6·0	+8·5	50	10	9·1
C15	15	13·8	15·6	8·0	+10	50	10	10
—C16	16	15·3	17·1	9·0	+11	20	10	11
—C18	18	16·8	19·1	11	+12	20	10	12
—C20	20	18·8	21·2	12	+14	20	10	13
—C22	22	20·8	23·3	13	+16	20	10	15
—C24	24	22·7	25·9	14	+18	20	10	16
—C27	27	25·1	28·9	18	+20	20	10	18
—C30	30	28	32	22	+25	20	10	20
—C33	33	31	35	25	+30	20	10	22
—C36	36	34	38	30	+32	20	10	24
—C39	39	37	41	35	+35	10	10	27
—C43	43	40	46	40	+40	10	10	30
—C47	47	44	50	50	+45	10	10	33
—C51	51	48	54	55	+50	10	10	36
—C56	56	52	60	63	+55	10	10	39
—C62	62	58	66	75	+60	10	10	43
—C68	68	64	72	90	+65	10	10	47
—C75	75	70	79	100	+70	10	10	51

2·5W (T_{amb} = 25°C) ±5% voltage tolerance, construction A4

BZX70								
—C7V5	7·5	7·0	7·9	3·5	+3·0	50	50	2·0
—C8V2	8·2	7·7	8·7	3·5	+4·0	50	20	5·6
—C9V1	9·1	8·5	9·6	4·0	+5·5	50	10	6·2
—C10	10	9·4	10·6	4·0	+7·0	50	10	6·8
—C11	11	10·4	11·6	4·5	+7·5	50	10	7·5
—C12	12	11·4	12·7	5·0	+8·0	50	10	8·2

Diodes

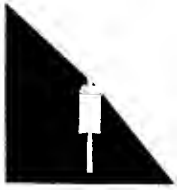
silicon voltage regulator diodes (cont.) book 1 part 3

2·5W (T_{amb} = 25°C) ±5% voltage tolerance, construction A4

Type No. **BZX70**	Nom. Zener Voltage (V)	Measured at Test I_Z Min. Voltage (V)	Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (mV/°C)	Test I_Z (mA)	Max. I_R at V_R (μA)	(V)
—**C13**	13	12·4	14·1	6·0	+8·5	50	10	9·1
—**C15**	15	13·8	15·6	8·0	+10	50	10	10
—**C16**	16	15·3	17·1	9·0	+11	20	10	11
—**C18**	18	16·8	19·1	11	+12	20	10	12
—**C20**	20	18·8	21·2	12	+14	20	10	13
—**C22**	22	20·8	23·3	13	+16	20	10	15
—**C24**	24	22·7	25·9	14	+18	20	10	16
—**C27**	27	25·1	28·9	18	+20	20	10	18
—**C30**	30	28	32	22	+25	20	10	20
—**C33**	33	31	35	25	+30	20	10	22
—**C36**	36	34	38	30	+32	20	10	24
—**C39**	39	37	41	35	+35	10	10	27
—**C43**	43	40	46	40	+40	10	10	30
—**C47**	47	44	50	50	+45	10	10	33
—**C51**	51	48	54	55	+50	10	10	36
—**C56**	56	52	60	63	+55	10	10	39
—**C62**	62	58	66	75	+60	10	10	43
—**C68**	68	64	72	90	+65	10	10	47
—**C75**	75	70	79	100	+70	10	10	51

15W (T_{amb} = 25°C) ±5% voltage tolerance, construction BQ.

Type No. **BZV15**	Nom. Zener Voltage (V)	Measured at Test Iz Min. Voltage (V)	Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp Coefficient (%/°C)	Test Iz (mA)	Max. I_R at V_R (μA)	(V)
—**C10**	10	9·4	10·6	0·5	0·09	1·0	50	6·8
—**C11**	11	10·4	11·6	1·0	0·09	1·0	50	7·5
—**C12**	12	11·4	12·7	1·0	0·09	1·0	50	8·2
—**C13**	13	12·4	14·1	1·0	0·09	1·0	50	9·1
—**C15**	15	13·8	15·6	1·2	0·09	1·0	50	10
—**C16**	16	15·3	17·1	1·2	0·09	0·5	50	11
—**C18**	18	16·8	19·1	1·5	0·09	0·5	50	12
—**C20**	20	18·8	21·2	1·5	0·075	0·5	50	13
—**C22**	22	20·8	23·3	1·8	0·075	0·5	50	15
—**C24**	24	22·7	25·9	2·0	0·08	0·5	50	16
—**C27**	27	25·1	28·9	2·0	0·082	0·5	50	18
—**C30**	30	28	32	2·5	0·085	0·5	50	20
—**C33**	33	31	35	3·0	0·088	0·5	50	22
—**C36**	36	34	38	4·0	0·09	0·2	50	24
—**C39**	39	37	41	5·0	0·09	0·2	50	27
—**C43**	43	40	46	6·5	0·092	0·2	50	30
—**C47**	47	44	50	7·0	0·093	0·2	50	33
—**C51**	51	48	54	7·5	0·093	0·2	50	36
—**C56**	56	52	60	8·0	0·094	0·2	50	39
—**C62**	62	58	66	9·0	0·094	0·2	50	43
—**C68**	68	64	72	10·0	0·094	0·2	50	47
—**C75**	75	70	79	10·5	0·095	0·2	50	51



Diodes

silicon voltage regulator diodes (cont.) book 1 part 3

20W (T_{mb} = 75°C) ±5% voltage tolerance, construction E1

Type No. ‡BZY93	Nom. Zener Voltage (V)	Measured at Test I_Z Min. Voltage (V)	Measured at Test I_Z Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp Coefficient (mV/°C)	Test I_Z (mA)	Max. I_R at V_R (μA)	Max. I_R at V_R (V)
—C6V8	6·8	6·4	7·2	0·2	+2·5	2·0	100	2·0
—C7V5	7·5	7·0	7·9	0·3	+3·0	2·0	100	2·0
—C8V2	8·2	7·7	8·7	0·3	+4·0	2·0	100	5·6
—C9V1	9·1	8·5	9·6	0·5	+5·0	1·0	50	6·2
—C10	10	9·4	10·6	0·5	+7·0	1·0	50	6·8
—C11	11	10·4	11·6	1·0	+7·5	1·0	50	7·5
—C12	12	11·4	12·7	1·0	+8·0	1·0	50	8·2
—C13	13	12·4	14·1	1·0	+8·5	1·0	50	9·1
—C15	15	13·8	15·6	1·2	+10	1·0	50	10
—C16	16	15·3	17·1	1·2	+11	0·5	50	11
—C18	18	16·8	19·1	1·5	+12	0·5	50	12
—C20	20	18·8	21·2	1·5	+14	0·5	50	13
—C22	22	20·8	23·3	1·8	+16	0·5	50	15
—C24	24	22·7	25·9	2·0	+18	0·5	50	16
—C27	27	25·1	28·9	2·0	+21	0·5	50	18
—C30	30	28	32	2·5	+25	0·5	50	20
—C33	33	31	35	3·0	+30	0·5	50	22
—C36	36	34	38	4·0	+32	0·2	50	24
—C39	39	37	41	5·0	+35	0·2	50	27
—C43	43	40	46	6·5	+40	0·2	50	30
—C47	47	44	50	7·0	+45	0·2	50	33
—C51	51	48	54	7·5	+50	0·2	50	36
—C56	56	52	60	8·0	+55	0·2	50	39
—C62	62	58	66	9·0	+60	0·2	50	43
—C68	68	64	72	10	+65	0·2	50	47
—C75	75	70	79	10·5	+70	0·2	50	51

‡Reverse polarity types (stud-anode) are available and are denoted by 'R' at the end of the type number, e.g. BZY93—C10R.

Diodes

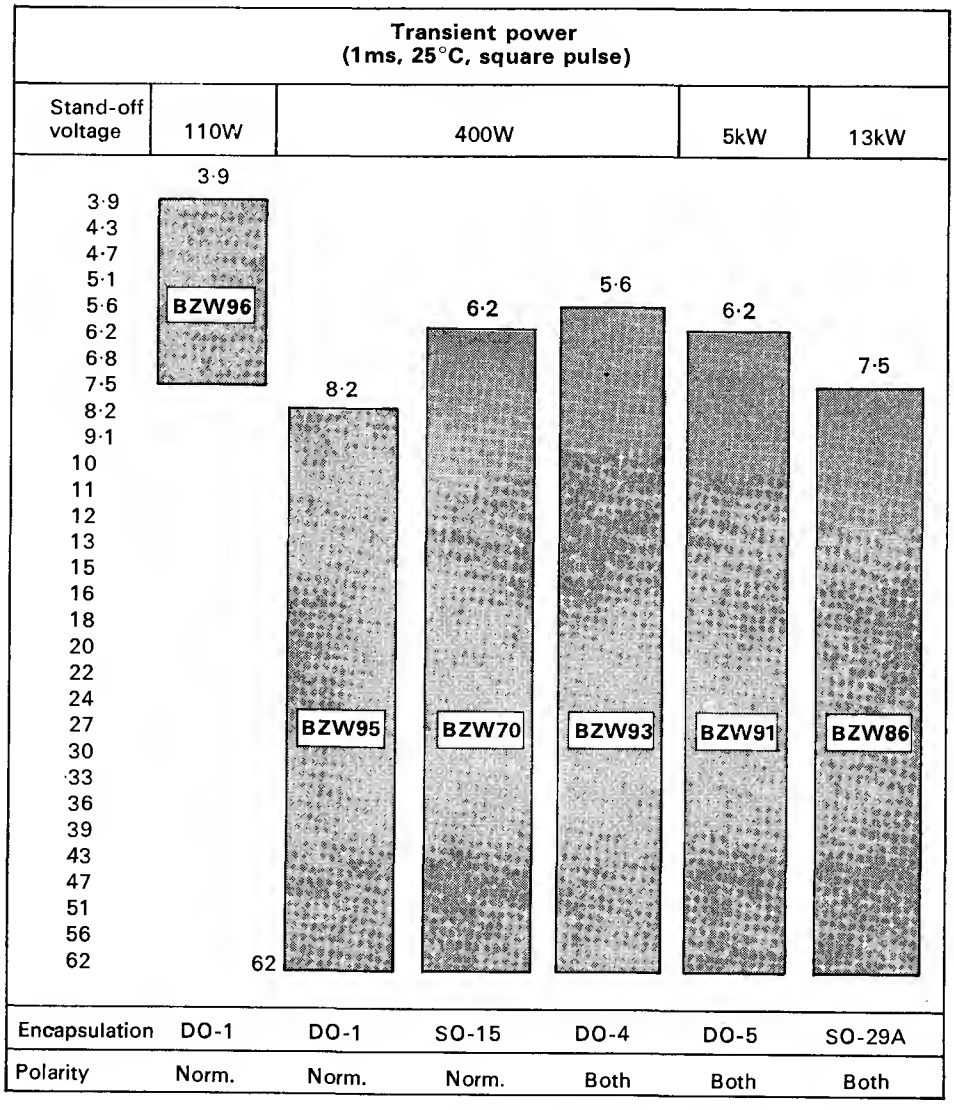
silicon voltage regulator diodes (cont.) book 1 part 3

75W (T_{mb} = 65°C) ±5% voltage tolerance, construction AF

Type No. ‡BZY91	Nom. Zener Voltage (V)	Measured at Test I_Z Min. Voltage (V)	Measured at Test I_Z Max. Voltage (V)	Max. Slope Resistance (Ω)	Typ. Temp. Coefficient (%/°C)	Test I_Z (A)	Max. I_R at V_R (mA)	Max. I_R at V_R (V)
—C7V5	7·5	7·0	7·9	0·2	+0·1	5·0	5·0	2·0
—C8V2	8·2	7·7	8·7	0·3	+0·1	5·0	5·0	5·6
—C9V1	9·1	8·5	9·6	0·4	+0·09	2·0	5·0	6·2
—C10	10	9·4	10·6	0·4	+0·09	2·0	1·0	6·8
—C11	11	10·4	11·6	0·4	+0·09	2·0	1·0	7·5
—C12	12	11·4	12·7	0·5	+0·09	2·0	1·0	8·2
—C13	13	12·4	14·1	0·5	+0·09	2·0	1·0	9·1
—C15	15	13·8	15·6	0·6	+0·09	2·0	1·0	10
—C16	16	15·3	17·1	0·6	+0·09	2·0	1·0	11
—C18	18	16·8	19·1	0·7	+0·09	2·0	1·0	12
—C20	20	18·8	21·2	0·8	+0·075	1·0	1·0	13
—C22	22	20·8	23·3	0·8	+0·075	1·0	1·0	15
—C24	24	22·7	25·9	0·9	+0·080	1·0	1·0	16
—C27	27	25·1	28·9	1·0	+0·082	1·0	1·0	18
—C30	30	28	32	1·1	+0·085	1·0	1·0	20
—C33	33	31	35	1·2	+0·088	1·0	1·0	22
—C36	36	34	38	1·3	+0·090	1·0	1·0	24
—C39	39	37	41	1·4	+0·090	0·5	1·0	27
—C43	43	40	46	1·5	+0·092	0·5	1·0	30
—C47	47	44	50	1·7	+0·093	0·5	1·0	33
—C51	51	48	54	1·8	+0·093	0·5	1·0	36
—C56	56	52	60	2·0	+0·094	0·5	1·0	39
—C62	62	58	66	2·2	+0·094	0·5	1·0	43
—C68	68	64	72	2·4	+0·094	0·5	1·0	47
—C75	75	70	79	2·6	+0·095	0·5	1·0	51

‡Reverse polarity types (stud-anode) are available and are denoted by 'R' at the end of the type number, e.g. BZY91—C10R.

Silicon surge suppressor diodes
selector chart book 1 part 4



110W pulse power rating (t_p=1ms) Construction Q2

Type No. **BZW96**	Max. Stand-off Voltage V_R (V)	I_R max. at V_R (mA)	Clamping Voltage $V_{(CL)R}$ (V) Typ.	Clamping Voltage $V_{(CL)R}$ (V) Max.	Measured at I_{RSM} (t_p = 500µs) (A)	Max. I_{RSM} (t_p = 1ms) (A)
—3V9	3·9	2·0	6·5	8·2	10	12
—4V3	4·3	0·2	7·5	8·8	10	11
—4V7	4·7	0·2	8·0	9·4	10	10
—5V1	5·1	0·2	8·5	10	10	9
—5V6	5·6	0·2	9·5	11	10	8·5
—6V2	6·2	0·1	11	13	10	8
—6V8	6·8	0·1	13	15	10	7·5
—7V5	7·5	0·1	14	15	10	7

Silicon surge suppressor diodes book 1 part 4

0.4kW pulse power rating (t_p = 1ms) Construction Q2

Type No.	Max. stand-off Voltage V_R (V)	I_R max. at V_R (mA)	Clamping Voltage $V_{(CL)R}$ (V) typ.	max.	Measured at I_{RSM} (t_p = 500μs) (A)	Max. I_{RSM} (t_p = 1ms) (A)
BZW95						
—8V2	8·2	0·1	13·5	15·5	20	28
—9V1	9·1	0·1	15	17·5	20	25
—10	10	0·1	17	19	20	22
—11	11	0·1	19	21	20	19
—12	12	0·1	21	23	20	17
—13	13	0·1	22	26	20	15
—15	15	0·1	23	26	10	15
—16	16	0·1	25	29	10	13
—18	18	0·1	28	33	10	12
—20	20	0·1	32	38	10	10
—22	22	0·1	36	43	10	9
—24	24	0·1	41	48	10	8
—27	27	0·1	47	54	10	7
—30	30	0·1	44	52	5	7
—33	33	0·1	49	58	5	6·5
—36	36	0·1	56	65	5	6
—39	39	0·1	63	72	5	5
—43	43	0·1	71	82	5	5
—47	47	0·1	80	93	5	4·5
—51	51	0·1	89	104	5	4
—56	56	0·1	98	116	5	3·5
—62	62	0·1	104	116	5	3

0.4kW pulse power rating (t_p = 1ms) Construction A4

BZW70						
—6V2	6·2	0·5	10	11·2		37
—6V8	6·8	0·5	11	12·5		34
—7V5	7·5	0·1	12	14		31
—8V2	8·2	0·1	13·5	15·5		28
—9V1	9·1	0·1	15	17·5	20A	25
—10	10	0·1	17	19		22
—11	11	0·1	19	21		19
—12	12	0·1	21	23		17
—13	13	0·1	23	26		15
—15	15	0·1	22	26		15
—16	16	0·1	25	29		13
—18	18	0·1	28	33	10A	12
—22	22	0·1	36	43		9
—24	24	0·1	41	48		8
—27	27	0·1	47	54		7

Silicon surge suppressor diodes book 1 part 4

0.4kW pulse power rating (t_p = 1ms) Construction A4

Type No.	Max. stand-off Voltage V_R (V)	I_R max. at V_R (mA)	Clamping Voltage $V_{(CL)R}$ (V) typ.	Clamping Voltage $V_{(CL)R}$ (V) max.	Measured at I_{RSM} (t_p = 500µs) (A)	max. I_{RSM} (t_p = 1ms) (A)
BZW70 (cont.)						
—30	30	0·1	44	52		7
—33	33	0·1	49	58		6·5
—36	36	0·1	56	65		6
—39	39	0·1	63	72		5
—43	43	0·1	71	82	5A	5
—47	47	0·1	80	93		4·5
—51	51	0·1	89	104		4
—56	56	0·1	98	116		3·5
—62	62	0·1	104	116		3

0.4kW pulse power rating (t_p = 1ms) Construction E

***BZW93**						
—5V6	5·6	0·5	9	10		40
6V2	6·2	0·5	10	11·2	20	37
—6V8	6·8	0·5	11	12·5	20	34
—7V5	7·5	0·1	12	14	20	31
—8V2	8·2	0·1	13·5	15·5	20	28
—9V1	9·1	0·1	15	17·5	20	25
—10	10	0·1	17	19	20	22
—11	11	0·1	19	21	20	19
—12	12	0·1	21	23	20	17
—13	13	0·1	23	26	20	15
—15	15	0·1	22	26	10	15
—16	16	0·1	25	29	10	13
—18	18	0·1	28	33	10	12
—20	20	0·1	32	38	10	10
—22	22	0·1	36	43	10	9
—24	24	0·1	41	48	10	8
—27	27	0·1	47	54	10	7
—30	30	0·1	44	52	5	7
—33	33	0·1	49	58	5	6·5
—36	36	0·1	56	65	5	6
—39	39	0·1	63	72	5	5·5
—43	43	0·1	71	82	5	5
—47	47	0·1	80	93	5	5
—51	51	0·1	89	104	5	4
—56	56	0·1	98	116	5	3·5
—62	62	0·1	104	116	5	3

*Reverse polarity types (stud-anode) are available and are denoted by suffix 'R' e.g. BZW93—9V1R

5kW pulse power rating (t_p = 1ms) Construction AF

***BZW91**						
—6V2	6·2	60	9·5	10·5	150	250
—6V8	6·8	60	10	11·5	150	250
—7V5	7·5	5	11	12·5	150	250
—8V2	8·2	5	12	13·5	150	250
—9V1	9·1	5	13	15	150	250
—10	10	5	14·5	17	150	250

*Reverse polarity types (stud-anode) are available and are denoted by suffix 'R' e.g. BZW91—9V1R

Silicon surge suppressor diodes book 1 part 4

5kW pulse power rating (t_p = 1ms) Construction AF

Type No.	Max. stand-off Voltage V_R (V)	I_R max. at V_R (mA)	Clamping Voltage $V_{(CL)R}$ (V) typ.	Clamping Voltage $V_{(CL)R}$ (V) max.	Measured at I_{RSM} (t_p = 500μs) (A)	Max. I_{RSM} (t_p = 1ms) (A)
*BZW91 (cont.)						
—11	11	5	16	19	150	250
—12	12	5	17·5	22	150	250
—13	13	5	19	26	150	250
—15	15	5	22	28	100	150
—16	16	5	24	31	100	150
—18	18	5	26	34	100	150
—20	20	5	28	37	100	150
—22	22	5	31	40	100	150
—24	24	5	34	44	100	150
—27	27	5	38	48	100	150
—30	30	5	40	52	50	70
—33	33	10	44	56	50	70
—36	36	10	49	61	50	70
—39	39	10	54	66	50	70
—43	43	10	60	72	50	70
—47	47	10	66	79	50	50
—51	51	10	72	87	50	50
—56	56	10	79	97	50	50
—62	62	10	86	97	50	50

*Reverse polarity types (stud-anode) are available and are denoted by suffix 'R' e.g. BZW91—9V1R

13kW pulse power rating (t_p = 1ms) Construction BF

*BZW86						
—7V5	7·5	2	12	14	1000	1000
—8V2	8·2	2	13	15·5	1000	930
—9V1	9·1	2	14	17	1000	860
—10	10	2	15·5	18·5	1000	800
—11	11	2	17	20	1000	740
—12	12	2	18·5	22	1000	680
—13	13	2	20	24	1000	500
—15	15	2	23	27	1000	500
—16	16	2	27	32	500	500
—18	18	2	31	36	500	450
—20	20	2	34	40	500	400
—22	22	2	37	43	500	350
—24	24	2	40	47	500	300
—27	27	2	44	52	500	250
—30	30	2	47	55	250	250
—33	33	2	51	60	250	230
—36	36	2	55	65	250	210
—39	39	2	60	70	250	190
—43	43	2	66	77	250	170
—47	47	2	72	84	250	170
—51	51	2	78	92	250	155
—56	56	2	85	102	250	140
—62	62	2	92	102	250	130

*Reverse polarity types (stud-anode) are available and are denoted by suffix 'R' e.g. BZW86—9V1R

Rectifier diodes & stacks

silicon avalanche rectifier diodes book 1 part 4

$I_{F(AV)}$ max. T_{mb} = 125°C (A)	Type No	V_{RWM} max. (V)	I_{FRM} max. (A)	I_{FSM} max. (10ms) (A)	Construction
1·5 (T_{amb} = 55°C)	**BYX45– 600R**	600	15	40	Q1
	– 800R	800			
	–1000R	1000			
6	**†BYX39– 600**	600	100	100	E1
	– 800	800			
	–1000	1000			
12	**†BYX40– 600**	600	250	200	E1
	– 800	800			
	–1000	1000			
20	**§†BYX25– 600**	600	440	360	E1
	– 800	800			
	–1000	1000			
40	**†BYX56– 600**	600	450	800	AF1
	– 800	800			
	–1000	1000			

†Reverse polarity types (stud-anode) are also available. These are denoted by the final letter R, e.g. BYX39–600R.
§Also available to BS9333–F003,

fast recovery silicon rectifier diodes

$I_{F(AV)}$ max. T_{mb} = 125°C (A)	Type No.	V_{RWM} max. (V)	t_{rr} max. (ns)	Q_s max. (nC)	Special features	Construction
1·2 (T_{amb} = 55°C)	**BYX55–350**	300	—			A4
	–600	500				
4	**1N3880**	100	350	400		E1
	1N3880R	100				
	1N3881/BYX50–200‡	200	150			
	1N3881R/BYX50–200R‡	200				
	1N3882/BYX50–300‡	300				
	1N3882R/BYX50–300R‡	300				
7 (T_{mb}=85°C)	**†BYX71–350**	300	—	—		BQ
	–600	500	300	700		
7·5	**§†BYX30–200**	200	350	700	These devices have avalanche characteristics and can be used in a series string for high voltage applications	E1
	–300	300				
	–400	400				
	–500	500				
	–600	600				
15	**†BYX46–200**	200	350	700		E1
	–300	300				
	–400	400				
	–500	500				
	–600	600				

†Reverse polarity types (stud-anode) are also available. These are denoted by the final letter R, e.g. BYX50–200R
‡Also available to BS9331–FO28.
§Also available to BS9333–F002.

Rectifier diodes & stacks

rectifier diodes book 1 part 4

$I_{F(AV)}$ max. T_{mb} = 125°C (A)	Type No.	V_{RRM} max. (V)	Construction
0·36 (T_{amb} = 40°C)	**BYX10**	1600	A3
1·0	**BY126**	650	A4
1·0	**BY127**	1250	A4
1·4 (T_{amb} = 30°C)	**BYX22–200**	300*	Q2
	–400	600*	
	–600	900*	
	–800	1200*	
2·5	†**BYX49–300**	300	BQ
	–600	600	
	–900	900	
	–1200	1200	
2·5	†**BYX38–300**	300	E1
	–600	600	
	–900	900	
	–1200	1200	

*V_{RSM} §Also available to BS9331–FO26

†Reverse polarity type (stud anode) are also available. They are denoted by the final letter R e.g. BYX48–600R.

$I_{F(AV)}$ max. T_{mb} = 125°C (A)	Type No.	V_{RRM} max. (V)	Construction
6·0	†**BYX48–300**	300	F1
	–600	600	
	–900	900	
	–1200	1200	
10	†**BYX42–300**	300	E1
	–600	600	
	–900	900	
	–1200	1200	
10 (T_{mb}=75°C)	†**BYX72–150**	150	BQ
	–300	300	
	–500	500	
40	§†**BYX52–300**	300	AF1
	–600	600	
	–900	900	
	–1200	1200	

high voltage devices

$I_{F(AV)}$ max. T_{amb} = 35°C (A)	$I_{F(AV)}$ max. T_{oil} = 90°C (A)	Type No.	V_{RWM} max. (kV)	Description
2·5mA	—	**BY182**	12	Silicon e.h.t. rectifiers in plastic envelopes.
2·5mA	—	**BY187**	11·5	
2·5mA	—	**BY209**	11·5	Silicon e.h.t. soft-recovery rectifier diode.
	50mA	**BYX29–75000**	75	Silicon avalanche diodes in ceramic envelopes with metal connectors. Intended for oil cooling.
		100000	100	
		125000	125	
		150000	150	
—	50mA	**BYX35**	25	Silicon diode in a ceramic tube. Intended for oil cooling.
0·4 (T_{amb} = 25°C)	—	**BY215**	12	Resin-potted, modular construction with centre-tap. Intended for natural convection cooling.
0·5	—	**OSS6700B**	4	Resin-potted, modular construction. Intended for natural convection cooling. A medium four-pin valve base with bayonet catch and connector plate is available.
1·5	—	**OSM9510-12**	12	Resin-potted, modular construction with centre-tap. Intended for natural convection cooling.

Rectifier diodes & stacks
high voltage devices (cont.) book 1 part 4

$I_{F(AV)}$ max. $T_{amb} = 35°C$ (A)	$I_{F(AV)}$ max. $T_{oil} = 90°C$ (A)	Type No.	V_{RWM} max. (kV)	Description
3·5	6·0	**OSS9110–3**	3	The stacks consist of three to thirty rectifier diodes connected in series mounted on standard valve bases or ¼" UNF studs at each end. Intended for natural convection or oil cooling.
		–30	30	
5·0	20 ($T_{oil} = 35°C$)	**OSS9210–3**	3	
		–30	30	
10	30 ($T_{oil} = 35°C$)	**OSS9410–3**	3	
		–30	30	

encapsulated silicon diode bridge modules
Single-phase

Maximum Average Output Current $T_{amb} \leqslant 35°C$ (A)	Maximum Average Output Current $T_{chassis} \leqslant 35°C$ (A)	Type No.	Construction	Maximum a.c. Input Voltages r.m.s. (V)	Maximum a.c. Input Voltages Repetitive Peak (V)	Maximum Av. Output Voltage (V)
0·7†	—	**OSH007**	BH3	570	1600	510
1·0	—	**BY179**	BX	280	800	400
1·0	—	**OSH01–100**	BJ	70	150	63
		OSH01–200		140	300	125
		OSH01–400		280	600	250
1·0	—	**OSH01A–100**	BH1	70	150	63
		OSH01A–200		140	300	125
		OSH01A–400		280	600	250
1·4	—	**BY164**	BX	42	120	60
2·0	—	**OSH02A–200**	BH2	140	350	125
		OSH02A–400		280	650	250
		OSH02A–600		420	950	375
		OSH02A–800		560	1250	510
3·0	—	**OSH03–200**	BL	140	200	125
		OSH03–400		280	400	250
		OSH03–600		420	600	375
		OSH03–800		560	800	510
5·0	—	**OSH05–200**	BM	140	300	125
		OSH05–400		280	600	250
		OSH05–600		420	900	375
		OSH05–800		570	1200	510
7·0	—	**OSH07–600**	BM	420	600	375
		OSH07–800		570	800	510
		OSH07–1000		710	1000	635
10	16	**OSH10–600**	BM	420	600	375
		OSH10–800		570	800	510
		OSH10–1000		710	1000	635
10	—	**OSH10A–200**	BM	140	300	125
		OSH10A–400		280	600	250
		OSH10A–600		420	900	375
		OSH10A–800		570	1200	510

†$T_{amb} = 45°C$

Rectifier diodes & stacks

bridge-connected rectifier diode stacks book 1 part 4

SINGLE PHASE BRIDGES

I_O d.c. max. at 35°C (A)	Type Number	V_I r.m.s. max. (V)	V_{IRM} max. (V)	V_O d.c. max. (V)
30	**OSH30–300**	140	300	125
	–600	280	600	250
	–900	420	900	375
	–1200	560	1200	500
40	**OSH40–300**	140	300	125
	–600	280	600	250
	–900	420	900	375
	–1200	560	1200	500
64	**OSH64–300**	140	300	125
	–600	280	600	250
	–900	420	900	375
	–1200	560	1200	500
110	**OSH110–300**	140	300	125
	–600	280	600	250
	–900	420	900	375
	–1200	560	1200	500

THREE PHASE BRIDGES

I_O d.c. max. at 35°C (A)	Type Number	V_I r.m.s. max. (V)	V_{IRM} max. (V)	V_O d.c. max. (V)
40	**OSK40–300**	140	300	190
	–600	280	600	380
	–900	420	900	570
	–1200	560	1200	760
57	**OSK57–300**	140	300	190
	–600	280	600	380
	–900	420	900	570
	–1200	560	1200	760
90	**OSK90–300**	140	300	190
	–600	280	600	380
	–900	420	900	570
	–1200	560	1200	760
150	**OSK150–300**	140	300	190
	–600	280	600	380
	–900	420	900	570
	–1200	560	1200	760

Thyristors & stacks

thyristors book 1 part 5

$I_{T(AV)}$ max. at T_{mb} = 85°C (180° conduction) (A)	Type No.	V_{RRM} max. (V)	I_{TSM} max. (10ms) (A)	I_{GT} min. (mA)	V_{GT} min. (V)	Special features	Construction
1·0 (T_{case} = 105°C)	**BTX18– 100**	120	10	5·0	2·0		H4
	– 200	240					
	– 300	350					
	– 400	500					
	– 500	600					
6·4	**BTY79– 100R**	100	80	30	3·0	Also available to BS9341 —F001 to F009	S
	– 200R	200					
	– 300R	300					
	– 400R	400					
	– 500R	500					
	– 600R	600					
	– 800R	800					
	–1000R	1000					
6·5	**BT101–300R**	300	55	10	2·0		S
	–500R	500					
6·5	**BT102–300R**	300	55	50	2·5		S
	–500R	500					
6·5	**BT107**	500	70	10	2·0		S
6·5	**BT108**	500	70	50	2·5		S
6·5	**BT109**	500	50	10	2·0		BRI

Thyristors & stacks

thyristors (cont.) book 1 part 5

$I_{T(AV)}$ max. at T_{mb} = 85°C (180° conduction) (A)	Type No.	V_{RRM} max. (V)	I_{TSM} max. (10ms) (A)	I_{GT} min. (mA)	V_{GT} min. (V)	Special features	Construction
9·0	**BTW38– 600R**	600	150	50	1·5	BTW38 Series $\frac{dV}{dt}$ max. = 20V/μs BTW38 Series V $\frac{dV}{dt}$ max. = 200V/μs	S but with M5 metric thread
	– 600RV						
	– 800R	800					
	– 800RV						
	–1000R	1000					
	–1000RV						
	–1200R	1200					
	–1200RV						
10	**BTY87–100R**	100	140	65	3·5		AD
	–200R	200					
	–300R	300					
	–400R	400					
	–500R	500					
	–600R	600					
	–800R	800					
14	**BTY91–100R**	100	200	40	3·0		AD
	–200R	200					
	–300R	300					
	–400R	400					
	–500R	500					
	–600R	600					
	–800R	800					
14	**BTW47–500RM**	600	220	150	3·5		AD but with M6 metric thread (see note 1)
	–800RM	800					
	–1000RM	1000					
	–1200RM	1200					
	–1400RM	1400					
	–1600RM	1600					
20	**BTW92– 600RM**	600	320	150	3·5	$\frac{dv}{dt}$ max. = 300V/μs $\frac{di}{dt}$ max. = 300A/μs	AD but with M6 metric thread (see note 1)
	– 800RM	800					
	–1000RM	1000					
	–1200RM	1200					
	–1400RM	1400					
	–1600RM	1600					
35	**BTW24– 600RM**	600	800	150	3·5		AC metric thread
	– 800RM	800					
	–1000RM	1000					
	–1200RM	1200					
	–1400RM	1400					
	–1600RM	1600					
90	**BTW23– 600RM**	600	2000	200	3·5		U metric thread (see note 1)
	– 800RM	800					
	–1000RM	1000					
	–1200RM	1200					
	–1400RM	1400					
	–1600RM	1600					

Note 1: Types with UNF thread are available on request. These are indicated by the suffix RU e.g. BTW23-600RU.
Flying leads or tags are available when required as alternative to the standard outline. Consult Mullard Ltd. before ordering.
Types with dv/dt of 1000V/μs are available on request. Add suffix 09 to the type number when ordering e.g. BTW23–800RM–09.

Thyristors & stacks

inverter type thyristors book 1 part 5

$I_{T(AV)}$ max. at T_{mb} = 85°C (180° conduction) (A)	Type No.	V_{RRM} max. (V)	t_q max. (μs)	$\frac{dV_D}{dt}$ max. (V/μs)	Construction
3·2	**BT127– 350R**	350	10		F4
	– 750R	750		—	
	BTW30– 300RM	300			
	– 400RM	400	6	200	
	– 500RM	500			
12	**– 600RM**	600			AD but with M6 metric thread (see note 1)
	– 800RM	800			
	–1000RM	1000	12	200	
	–1200RM	1200			
	BTW31– 300RM	300			
	– 400RM	400	12	200	
	– 500RM	500			
16	**– 600RM**	600			AD but with M6 metric thread (see note 1)
	– 800RM	800			
	–1000RM	1000	20	200	
	–1200RM	1200			
	BTW32– 800RM	800			AC
	–1000RM	1000	25	200	metric thread
26	**–1200RM**	1200			
	BTW33– 800RM	800			U
	–1000RM	1000	25	200	metric thread
65	**–1200RM**	1200			

Note 1: Types with UNF thread are available on request. These are indicated by the suffix RU e.g. BTW31–800RU.

pulse modulator thyristors

$I_{T(RMS)}$ max. (A)	Type No.	V_{DWM} max. (V)	V_{RWM} max. (V)	I_{TRM} max. ½ sine wave t ⩽ 2μs (A)	$\frac{di}{dt}$ max. (A/μs)	Construction
5	**BTW35**	500	300	100	1000	S
	BTX95–500R	500	250			
15	**–600R**	600	300			
	–700R	700	350	200	1000	S
	–800R	800	400			

T.V. line output thyristors

$I_{T(AV)}$ max. at T_{mb}=85°C 180° conduction (A)	Type No.	I_{TSM} (max.) (10 mS) (A)	I_{GT} min. (mA)	V_{GT} min. (V)	tq (μs)	Construction
3·2	**BT128**	50	40	4·0	4·5	F4
	BT129				2·4	

These devices incorporate a diode connected inverse-parallel. Q_s=7μC, t_{rr}=300ns.

Thyristors & stacks
triacs book 1 part 5

$I_{T(RMS)}$ max. (A)	Type No.	$\pm V_{DRM}$ max. (V)	I_{GT} min. (mA)	V_{GT} min. (V)	Special features	Construction
12 (T_{mb} = 85°C)	**BTW37– 600**	600	100	2·5	BTW37 Series: $\frac{dV}{dt}$ max. = 20V/μs BTW37 Series V: $\frac{dV}{dt}$ max. = 200V/μs	S but with M5 metric thread
	– 600V					
	– 800	800				
	– 800V					
	–1000	1000				
	–1000V					
	–1200	1200				
	–1200V					
25 (T_{mb} = 85°C)	**BTX94– 100**	100	150	3·0		AD
	– 200	200				
	– 300	300				
	– 400	400				
	– 500	500				
	– 600	600				
	– 800	800				
	–1000	1000				
	–1200	1200				
50 (T_{mb} = 85°C)	**BTW44– 100**	100	200	2·5		AC (metric thread)
	– 200	200				
	– 300	300				
	– 400	400				
	– 500	500				
	– 600					
50 (T_{mb} = 80°C)	**BTW34– 600**	600	200	2·5		AC (metric thread)
	– 800	800				
	–1000	1000				
	–1200	1200				

thyristor trigger & control modules book 3 part 6

61 series

Type number	Description	Function
TT61	Trigger transformer	Interface, giving two isolated outputs for use between thyristor or triac gates and control sections
UPA61	Universal power amplifier	(a) Pulse generator for driving TT61 (b) D.C. driver (c) Other circuit functions
RSA61	Rectifier and synchroniser	Provides power supplies and synchronising signals
DOA61	Differential operational amplifier	For use in closed loop control systems
2NOR61	Twin NOR	For logic functions

MY5000 series

The following trigger modules and accessories are capable of triggering Mullard thyristors over their full temperature range. Suitable for both single phase or three phase operation, control is achieved by means of an external variable resistor or from an external voltage or current source. In addition, feedback may be applied where automatic control is required.

Type	Firing Angle Control Range	Equivalent Range of Power Control in Resistive Load	T_{amb}
MY5011	5°—167°	99·9% to 0·25%	−20°C + 65°C
MY5201	Transformer to drive MY5011.		

Thyristors & stacks

bridge-connected thyristor stacks book 1 part 5

Single-phase

Max. mean output current 180° conduction of each thyristor $T_{amb} \leqslant 35°C$		Repetitive peak output current	Circuit Diagram	
Natural convection cooling	Forced air cooling 500ft/min		250V r.m.s.	440V r.m.s.
10A	12A	40A	**OTH10–608L**	**OTH10–1008L**
16A	20A	200A	**OTH16–608L**	
20A	32A	140A	**OTH20–608A**	
28A	32A*	200A	**OTH28–608**	**OTH28–1208**
37A	40A	320A	**OTH37–608**	**OTH37–1208**
54A	70A†	450A	**OTH54–608**	**OTH54–1208**
62A	70A	450A	**OTH62–608**	**OTH62–1208**
84A	94A	1250A	**OTH84–608**	**OTH84–1208**
105A	180A	1250A	**OTH105–608**	**OTH105–1208**

†At $T_{amb} \leqslant 60°C$ *At $T_{amb} \leqslant 55°C$

Three-phase

Maximum mean output current 120° conduction of each thyristor $T_{amb} \leqslant 35°C$		Repetitive peak output current	Circuit Diagram
Natural convection cooling	Forced air cooling 500 ft/min		
40A	48A	200A	**OTK40–1208**
48A	48A	200A	**OTK48–1208**
66A	90A	800A	**OTK66–1208**
90A	90A	450A	**OTK90–1208**
130A	225A	1250A	**OTK130–1208**
200A	225A	1250A	**OTK200–1208**
225A	225A	1250A	**OTK225–1208**

Other types of stacks can be built to customers' requirements

Thyristors & stacks

a.c. controller thyristors stacks book 1 part 5

Single-phase

Maximum r.m.s. current 180° conduction of each thyristor $T_{amb} \leqslant 35°C$		Controlled power Resistive load				Circuit Diagram	
		250Vr.m.s.		440Vr.m.s.			
Natural convection cooling	Forced air cooling 500 ft/min	Natural cooling	Forced air cooling	Natural cooling	Forced air cooling	250Vr.m.s.	440Vr.m.s.
11A	14A	2·6kW	3·3kW	4·7kW	6·1kW	**OTH11–609L**	**OTH11–1009L**
20A	30A	5·0kW	7·5kW	8·8kW	13·2kW	**OTH20–609L**	**OTH20–1209L**
25A	25A*	6·2kW	6·2W*	11kW	11kW	**OTH25–605†**	**OTH25–1205†**
35A	44A	8·7kW	11kW	15kW	19kW	**OTH35–609**	**OTH35–1209**
44A	44A*	11kW	11kW	19kW	19kW	**OTH44–609B**	**OTH44–1209B**
66A	78A	18kW	19kW	29kW	34kW	**OTH66–609**	**OTH66–1209**
78A	78A	19kW	19kW	34kW	34kW	**OTH78–609**	**OTH78–1209**
120A	200A	30kW	50kW	53kW	88kW	**OTH120–609**	**OTH120–1209**

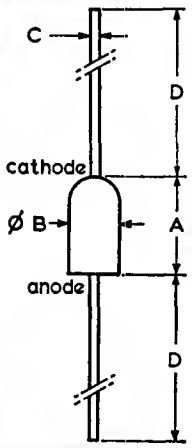
*At $T_{amb} \leqslant 60°C$ †Incorporates TRIAC BTX94

Three-phase

Maximum r.m.s. current per phase, 180° conduction of each thyristor $T_{amb} \leqslant 35°C$		Controlled power Resistive load at 440Vr.m.s.		Circuit Diagram
Natural convection cooling	Forced air cooling 500 ft/min	Natural cooling	Forced air cooling	
11A	—	8·3kW	—	**OTK11–1009L**
25A	44A	18kW	31kW	**OTK25–1209**
35A	35A at $T_{amb} \leqslant 55°C$	25kW	26kW	**OTK35–1209B**
44A	49A at $T_{amb} \leqslant 55°C$	33kW	37kW	**OTK44–1209**
66A	78A	47kW	56kW	**OTK66–1209**
110A	200A at $T_{amb} \leqslant 45°C$	79kW	143kW	**OTK110–1209F**
150A				
175A		Built to customer requirements		
200A				

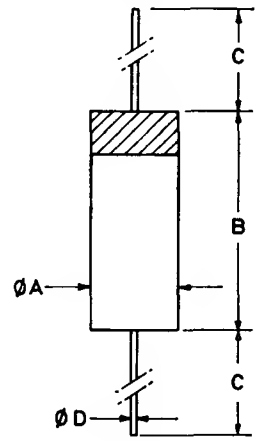
CONSTRUCTION and DIMENSIONS (All dimensions in millimetres)

A



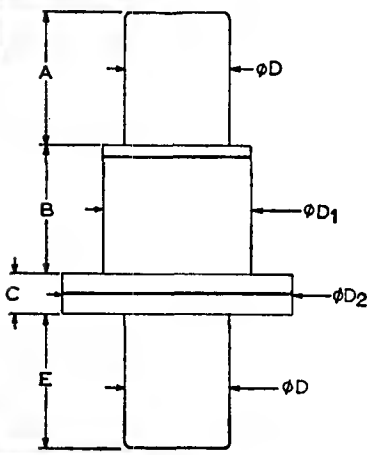
	A1 DO-7	A2 DO-15	A3 DO-14	A4
A max.	7·6	7·6	7·6	12·5
ϕ B max.	2·5	3·56	3·56	6·5
ϕ C nom.	0·52	0·8	0·5	1·05
D min.	25	25	25	25

B



	B1 DO-35	B2
ϕA max.	1·85	2·70
B max.	4·5	5·85
C min.	24	28
ϕD max.	0 56	0·86

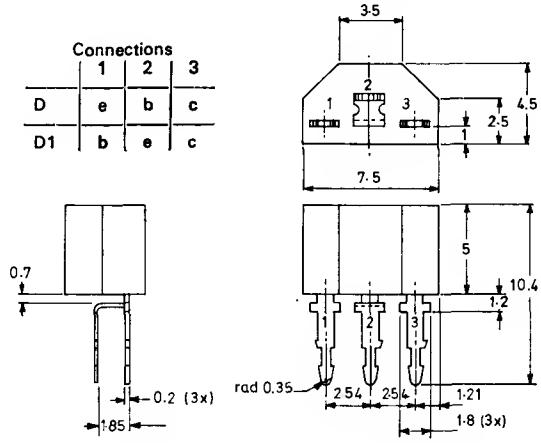
C



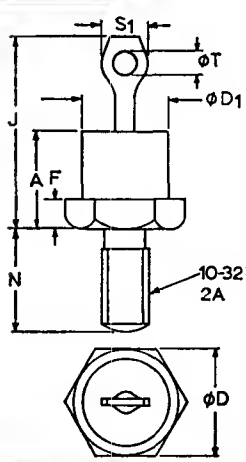
	Nom.
A	1·57
B	1·70
C	0·55
ϕD	1·56
ϕD1	2·00
ϕD2	3·05
E	1·57

D

Connections	1	2	3
D	e	b	c
D1	b	e	c



E



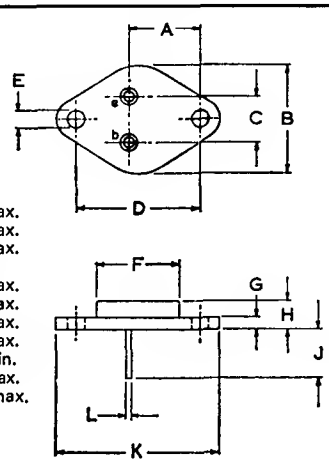
SO-10, DO-4

A	10·28
D	11·1 max.
ϕD1	9·3 mex.
F	3.2
J	20·3 mex.
N	11·1
S1	4·7 mex.
ϕT	2·3 min.

Connections	Stud	Eyelet
E1	k	a
E2	a	k

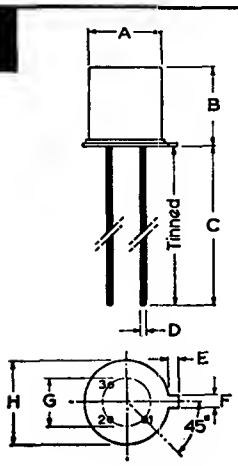
F

F1, F2, SO-5B/SB2-2 TO-3
F3, SO-55/SB2-5
F4, TO-66



	F1	F2	F3	F4
A	16·9		13·1	14·99 max.
B	26·2 max.		19·0 max.	17·78 max.
C	10·9		6·0	5·33 max.
D	30·1		23·0	24·3
E	4·2 max.		4·0	3·86 max.
F	20·3 max.		14·6	12·7 max.
G	3·15	0·9	2·8	1·91 max.
H	9·5 max.		8·9 max.	8·64 max.
J	12·0		9·0 min.	9·14 min.
K	39·5 max.		31·4 max.	31·6 max.
L	1·0		1·0	·863 max.

G



G1,2,3,4,5
SO-12A/SB3-6A
TO-18

A	4·8 mex.
B	5·3 max.
C	12·7 min.
D	0·43
E	1·0
F	1·05
G	2·54
H	5·55

Connections	1	2	3	
G1	e	b	c	c+envelope
G2	s	d		g+envelope
G3	d	g		s+envelope
G4	A	A		K
G5	A	–		K

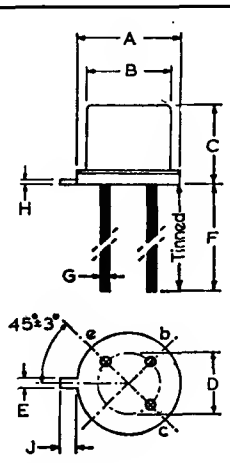
H

H1,2,3,4,5
SO-3/SB3-3A
TO-5

A	8·9
B	8·15
C	6·35
D	5·08
E	0·79
F	12·7 min.
G	0·48 max.
H	0·4
J	0·85

H1 b+case
H2 case isolated
H3 c+case

H4 e cathode
b gate
c anode+case



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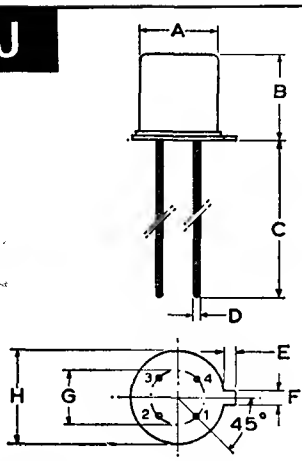
J



J1,2,3,4,5,6,7
SO-12A/SB4-3
TO-72

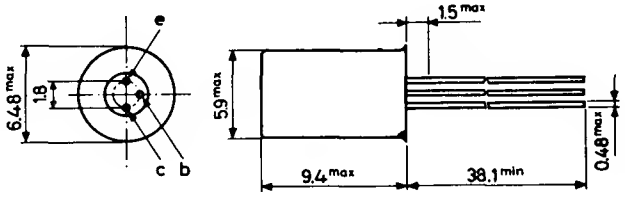
A	4·8 max.
B	5·3 max.
C	12·7 min.
D	0·43
E	1·0
F	1·05
G	2·54
H	5·55

Connections

	1	2	3	4
J1	b	e	c	s+envelope
J2	e	b	c	s+envelope
J3	s	d	g	screen+envelope
J4	d	g	g	s+envelope
J5	d	s	g	b+envelope
J6	K	G_K	G_A	A
J7	O/p	V p	I/p	V_N

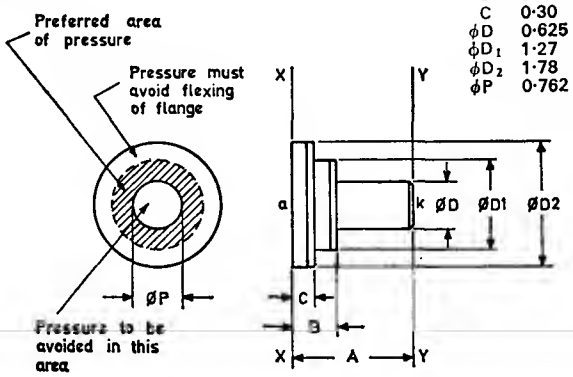
K

SO-21/SB3-10
TO-1

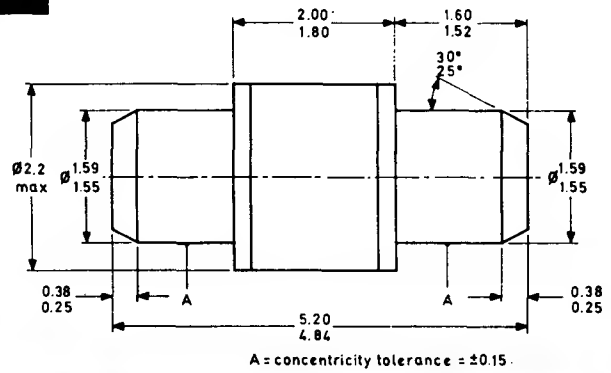


L

	Nom.
A	1·52
B	0·75
C	0·30
ϕD	0·625
ϕD_1	1·27
ϕD_2	1·78
ϕP	0·762

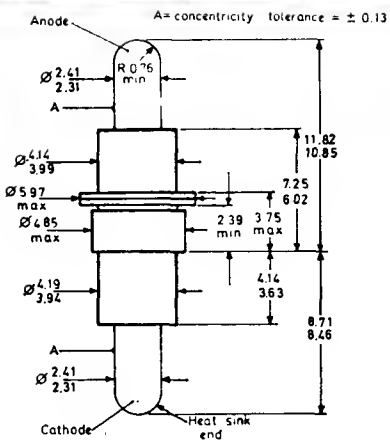


M

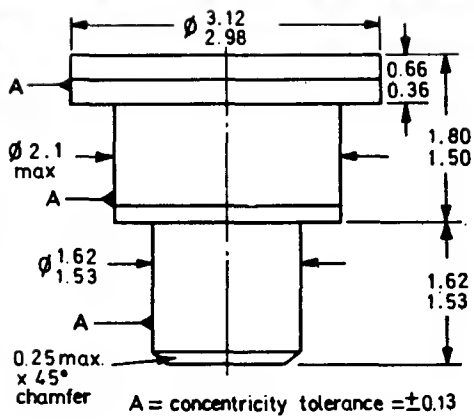


A = concentricity tolerance = ±0.15

N

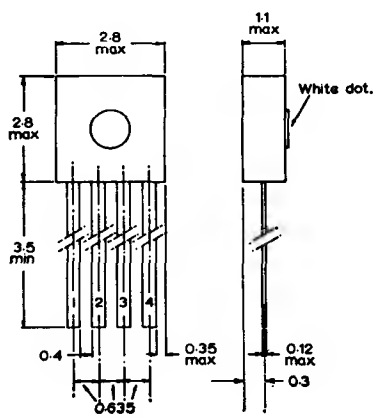


O



A = concentricity tolerance = ±0.13

P

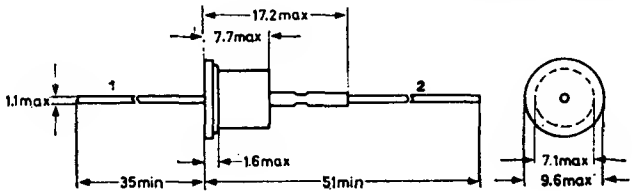


Q

SO-16
DO-1, 2, 3

Connections

	1	2
Q1	Anode	Cathode
Q2	Cathode	Anode

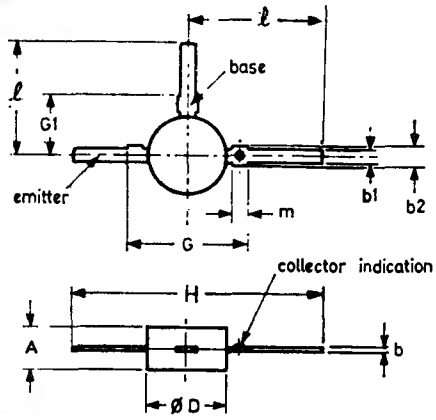


CONSTRUCTION and DIMENSIONS (All dimensions in millimetres)—*continued*

R

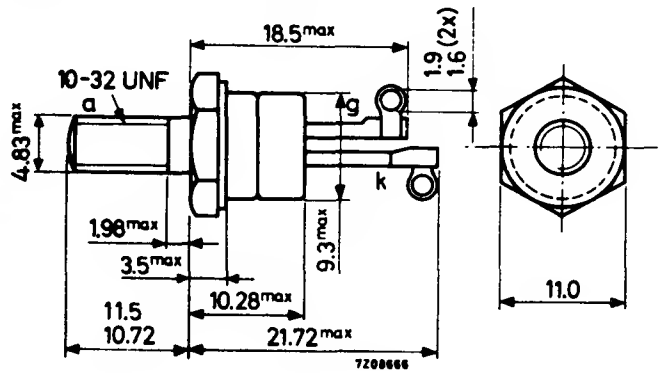
CH

A	2·7 max
B	0·19 max
b1	1·15 max
b2	1·55 max
ϕD	4·8 max
G	7·7 max
G1	3·9 max
H	14 min
ℓ	7·0 min
m	1·1 max

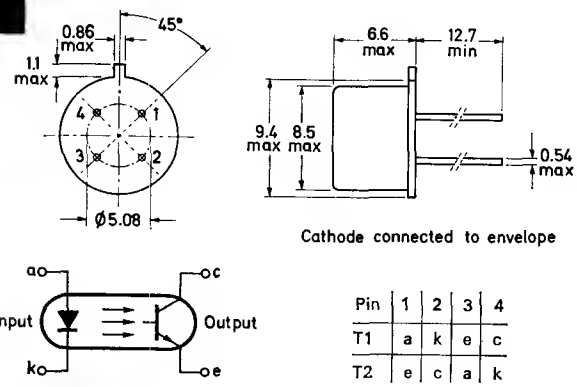


S

SO-35A



T

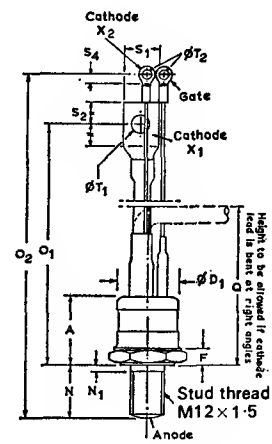


Pin	1	2	3	4
T1	a	k	e	c
T2	e	c	a	k

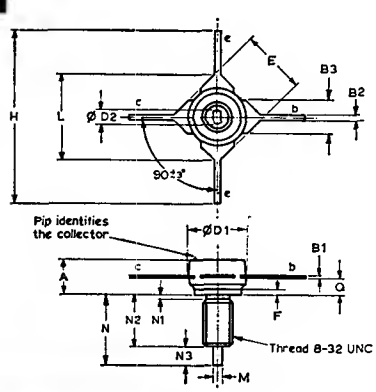
U

SO-30C
TO-94

A	28·5 max.
ϕD_1	24·1 max.
F	8·9 max.
N	21·0 max.
N_1	3·0 max.
O_1	158 max.
O_2	190 max.
Q	63·5 max.
S_1	16·5 max.
S_2	9·6 min.
S_4	3·8 min.
ϕT_1	8·3 max.
ϕT_2	4·2 max.

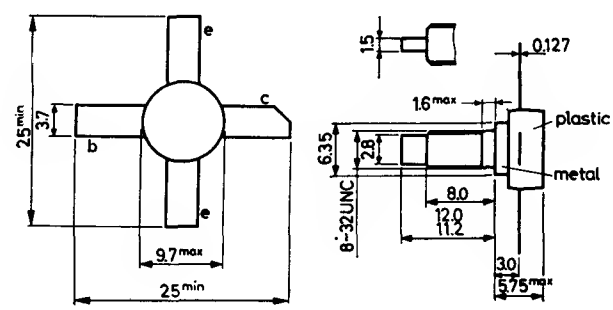


V

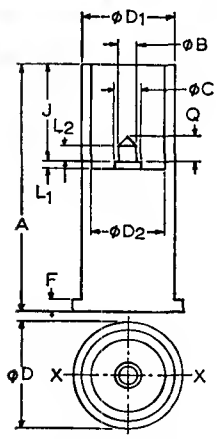


	Nom.
A	5·5
B_1	0·12
B_2	0·9
B_3	5·7
ϕD_1	9·3
ϕD_2	2·8
E	10·6
F	1·25
H	27·0
L	14
M	1·5
N	11·6
N_1	1·6 max.
N_2	8·0
N_3	3·68 max.
Q	3·0 max.

W



X

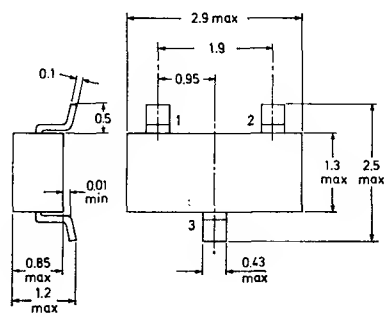


SO-26

	Max.
A	19·3
ϕB	1·32
ϕC	2·387
ϕD	9·52
ϕD_1	8·737
ϕD_2	7·264
F	1·39
J	6·477
L_1	0·762
L_2	1·27
Q	2·10

Y

Connections	1	2	3
Y1	b	a	c
Y2	s	d	g
Y3	nc	a	k
Y4	a	a	k
Y5	k	k	a
Y6	k	a	com-mon
Y7	a	b	c



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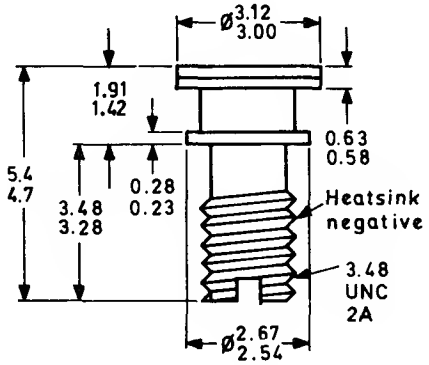
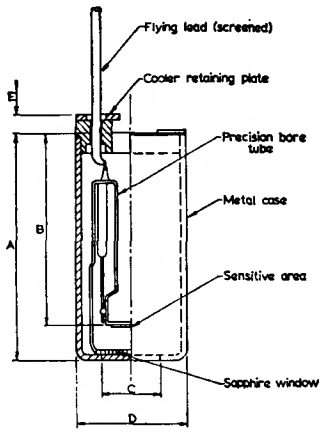
Z

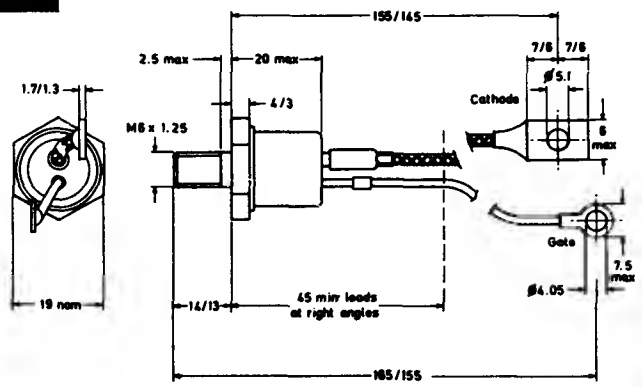


AB

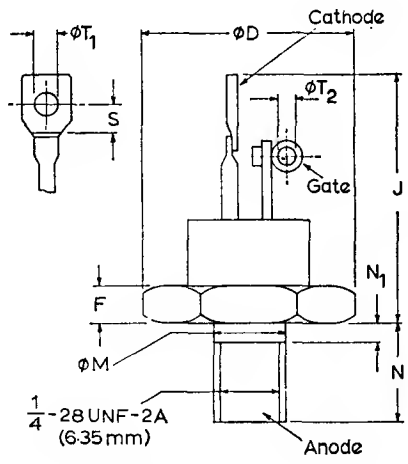


A	48·0
B	42·0
C	14·0 dia.
D	23·0 dia.
E	4·0

AC

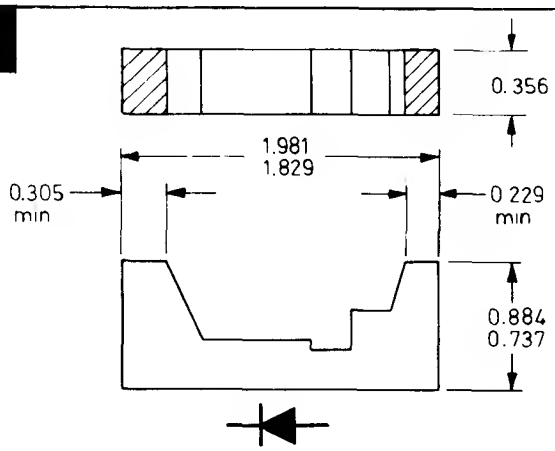


AD



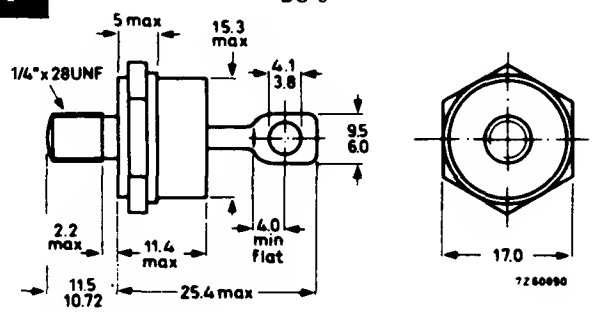
SO-36, TO-48	
ØD	16·51 max.
F	5·5 max.
J	30·48 max.
ØM	6·35 max.
N	11·50 max.
N_1	2·26 max.
S	3·05 min.
$ØT_1$	3·18 min.
$ØT_2$	1·53 min.

AE



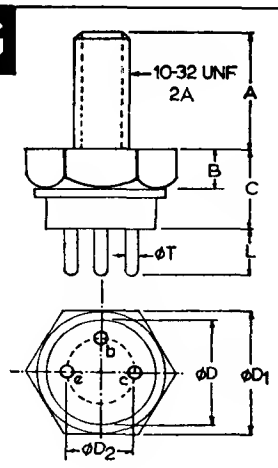
AF

SO-13
DO-5



Connections	Stud	Eyelet
AF1	k	a
AF2	a	k

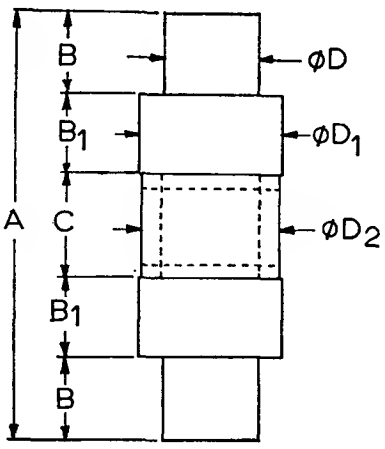
AG



TO-60	Max.
A	11·50
B	3·10
C	7·62
ØD	8·6
$ØD_1$	11·10
$ØD_2$	5·08 nom.
L	4·70
ØT	1·10

Emitter connected to envelope

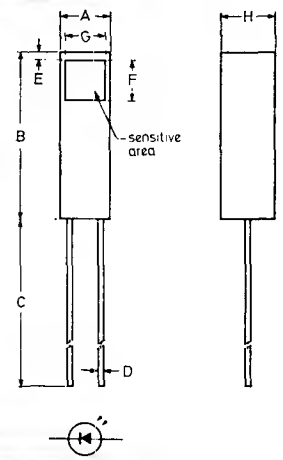
AH



	Max.
A	7·16
B	1·42
B_1	1·32
C	1·80
ØD	1·75
$ØD_1$	2·565
$ØD_2$	2·51

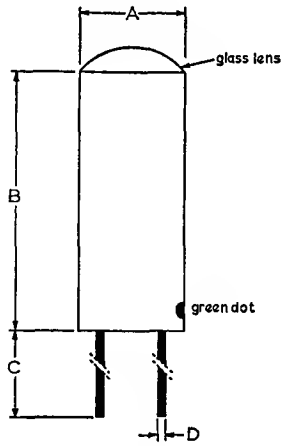
CONSTRUCTION and DIMENSIONS (All dimensions in millimetres)—*continued*

AJ



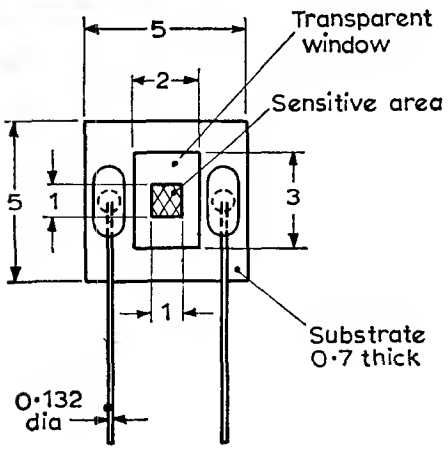
	Nom.
A	2·18
B	6·8
C	37 min.
D	0·25
E	0·29
F	1·7
G	1·7
H	2·24

AK

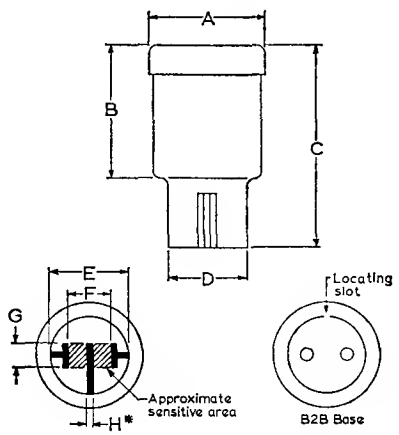


	AK_1 Nom.	AK_2 Nom.
A	2·8	2·0
B	8·0	8·0
C	33	33
D	0·34	0·34

AL



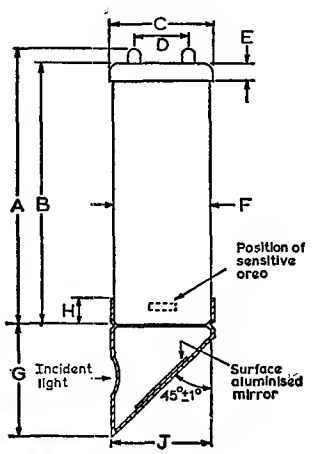
AM



A	22 max.
B	28·5
C	41 max.
D	13.8
E	11
F and G	6·0
*H	0·5

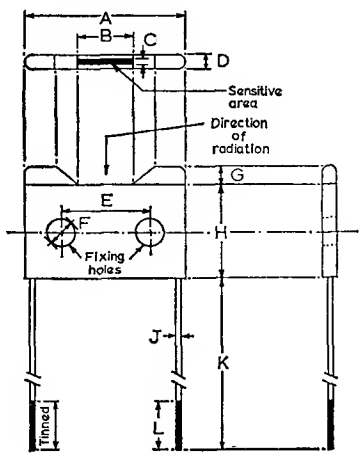
*Electrode not present on 62SV

AN



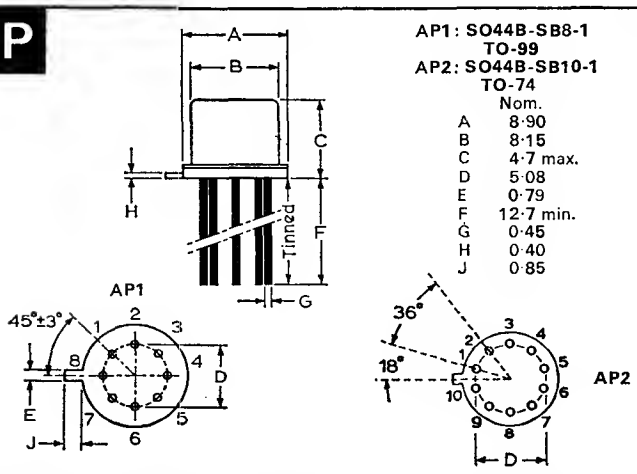
A	134 max.
B	127 max.
C	36·2
D	25
E	5·0
F	35·45 dia
G	42
H	15
J	37 dia.

AO



	Nom.
A	17
B	6·0
C	0·5
D	1·5
E	9·5
F	3·0 dia.
G	2·0
H	10
J	0·5
K	37 min.
L	5·0 min.

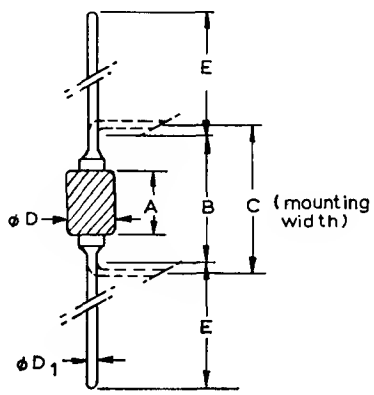
AP



AP1: SO44B-SB8-1
TO-99
AP2: SO44B-SB10-1
TO-74

	Nom.
A	8·90
B	8·15
C	4·7 max.
D	5·08
E	0·79
F	12·7 min.
G	0·45
H	0·40
J	0·85

AQ



	AQ1	AQ2
A	3·4 max.	3·1 max.
B	6·35 max.	6·0
C	7·6 min.	9·0 min.
ϕD	2·4 max.	2·8 max.
ϕD1	0·56 max.	1·1 max.
E	25·4 min.	29

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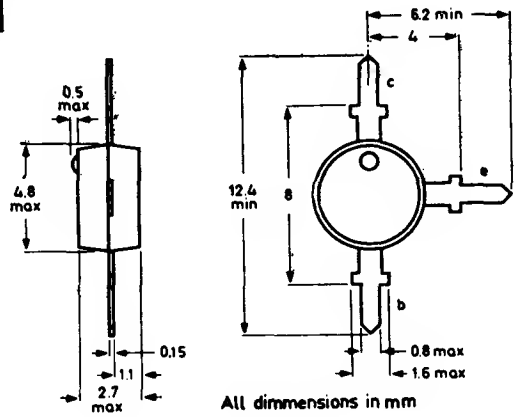
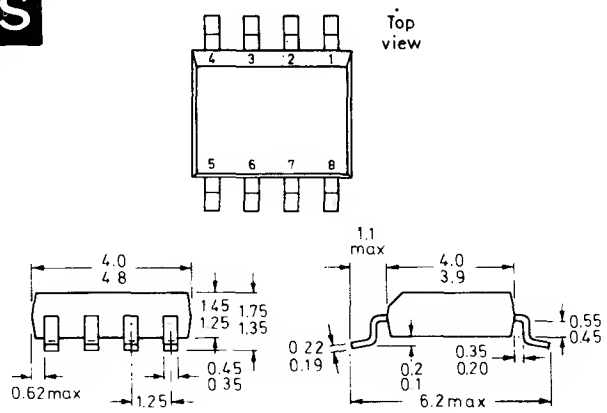
AR

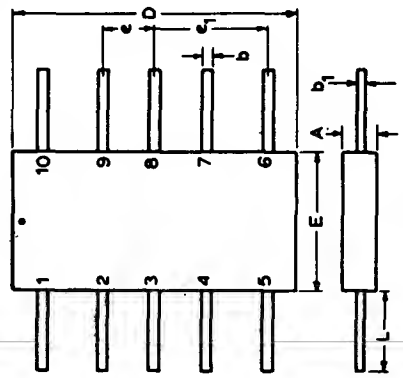


All dimmensions in mm

AS

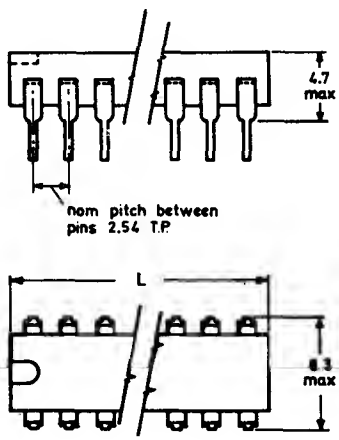


AT



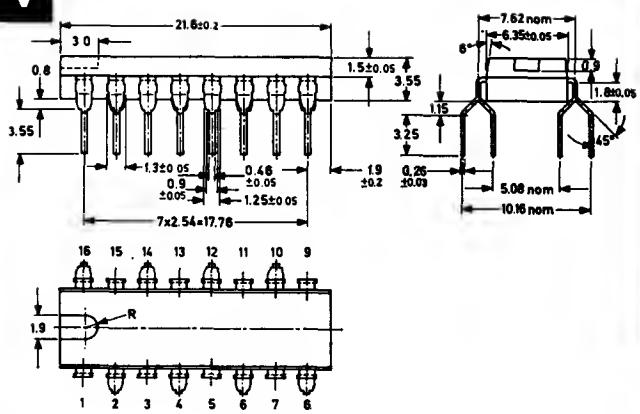
TO-89	
A	1·75 *max*
D	6·6 max
E	3·4
L	4·4
b	0·34
b_1	0·11
e	1·27
e_1	2·54

AU

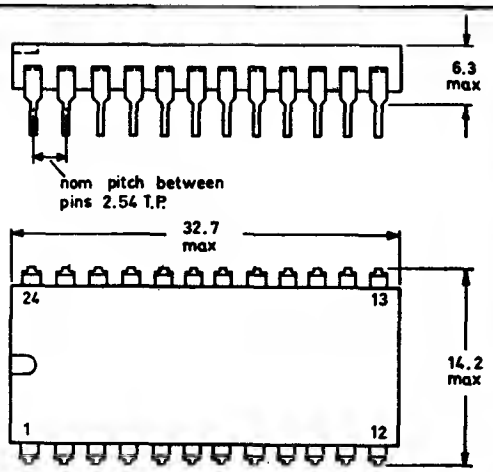


	Number of Leads	L mex.
AU1	14	19·5
AU2	16	22
AU3	8	9·5

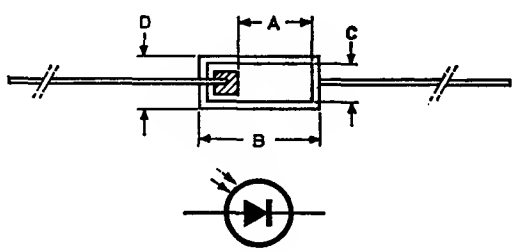
AV



AW



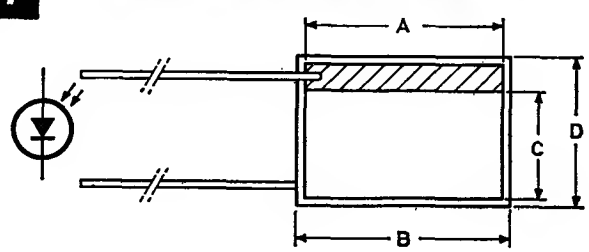
AX



	BPX40 Nom.	BPX41 Nom.
A	2·2	3·55
B	3·35	4·7
C	0·95	1·85
D	1·25	2·15

Lead length 30
Leed diemeter .0·15

AY

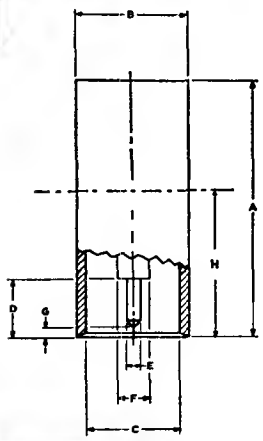


	Nom.
A	6·7
B	7·0
C	3·7
D	5·0

Lead length 30
Leed diameter 0·15

CONSTRUCTION and DIMENSIONS (All dimensions in millimetres)—*continued*

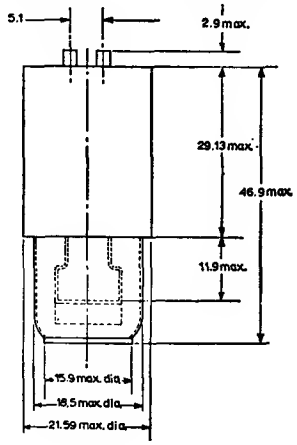
AZ



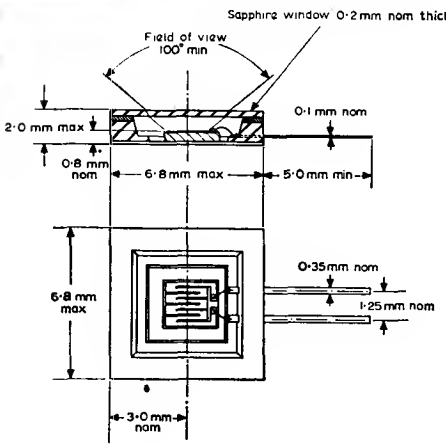
	Max.
A	19·43
B dia.*	5·59
C dia.	4·80
D	3·73 min.
E dia.	0·86
F dia.	1·60 nom.
G	0·71
H	10·32 nom.

*Thase tolarances apply only over H

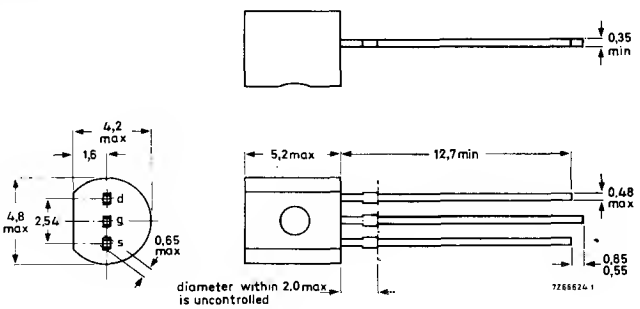
BA



BB

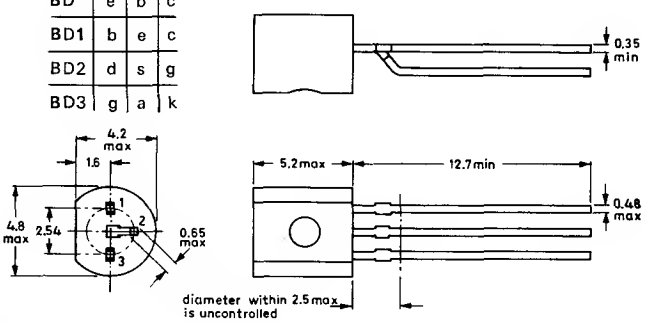


BC

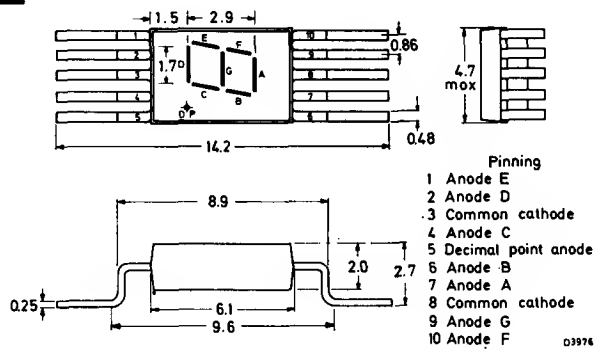


BD

Pin	1	2	3
BD	e	b	c
BD1	b	e	c
BD2	d	s	g
BD3	g	a	k



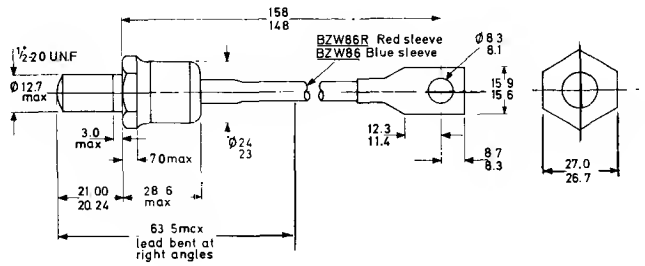
BE



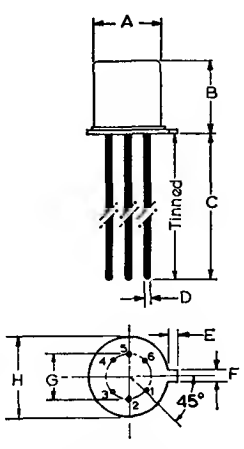
Pinning
1 Anode E
2 Anode D
3 Common cathode
4 Anode C
5 Decimal point anode
6 Anode B
7 Anode A
8 Common cathode
9 Anode G
10 Anode F

D3976

BF



BG



TO-71

A	4·8 max.
B	5·3 max.
C	12·7 min
D	0·43
E	1·0
F	1·05
G	2·54
H	5·55

Pin	1	2	3	4	5	6
BG1	e1	c2	c1	b2	b1	c1
BG2	s1	d1	g1	s2	d2	g2

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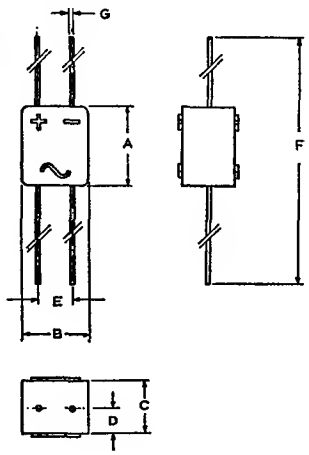
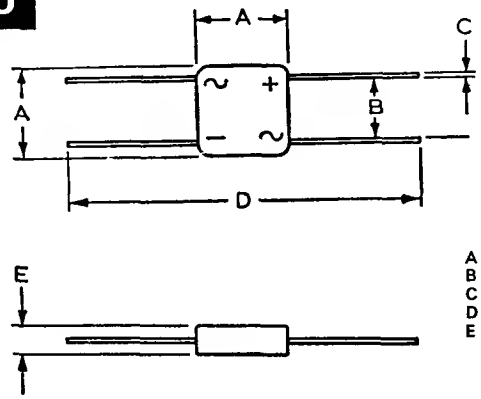
BH



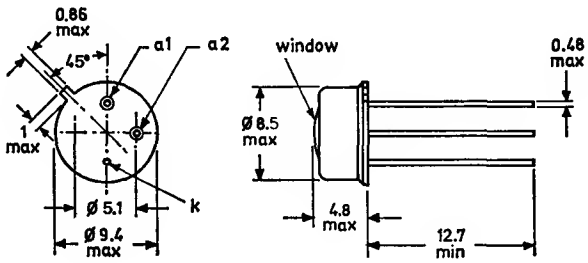
	BH1	BH2	BH3
A	12	20	12
B	10	19	10
C	8	15	8
D	4	7·5	4
E	5	10	5
F	58	60	58
G	0·75	1·0	1·1

BJ



	Nom.
A	15
B	10·2
C	0·75
D	58·4
E	5·8

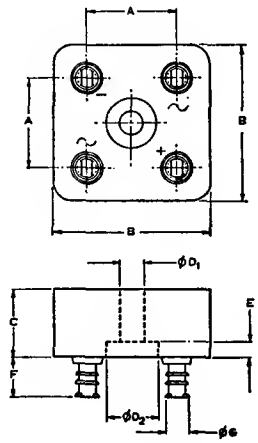
BK



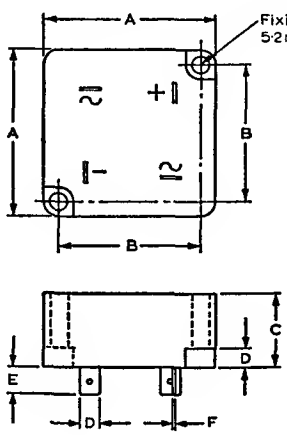
BL

SO-67

	Min.	Max.
A	20	21
B	–	34·6
C	–	15·2
ϕD1	–	5·05
ϕD2	–	11
E	–	3·7
F	–	9·0
ϕG	–	4·8

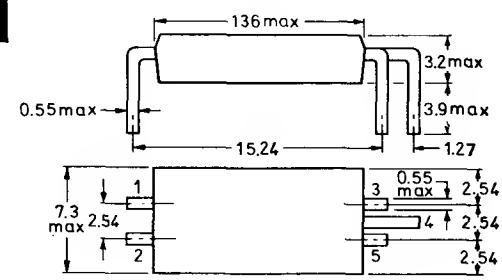


BM



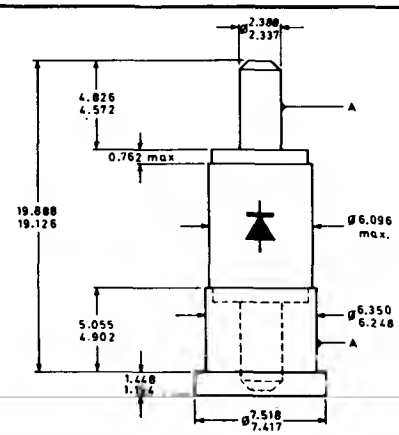
	Nom.
A	57·1
B	47·6
C	25·4
D	6·4
E	9·0
F	0·8

BN



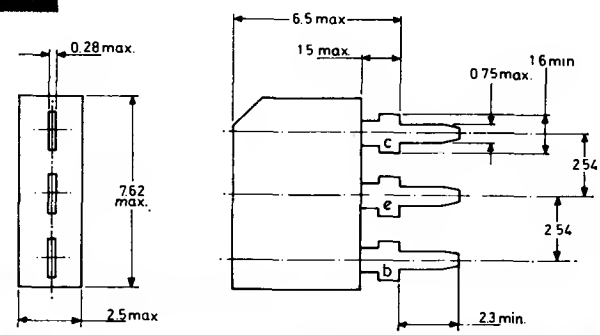
Pin	1	2	3	4	5
BN1	a	k	b	c	e
BN2	k	a	e	omitted	c

BO



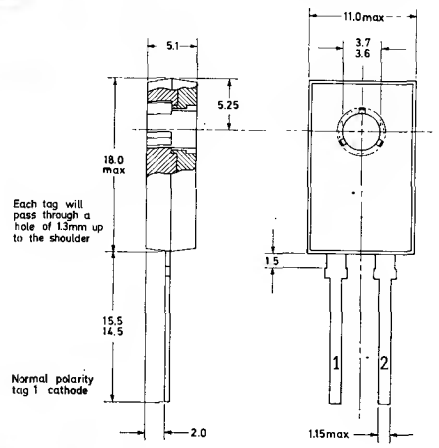
A = concentricity tolerance = ±0.18

BP

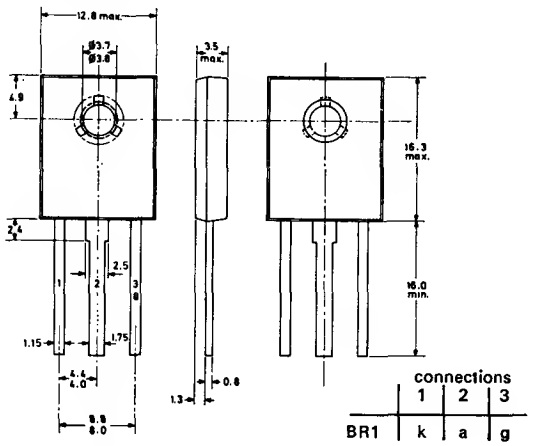


CONSTRUCTION and DIMENSIONS (All dimensions in millimetres)—*continued*

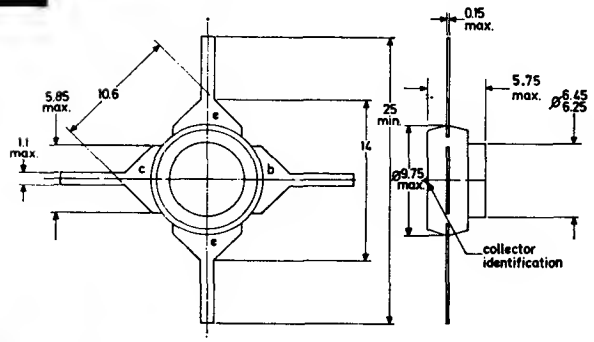
BQ



BR



BS



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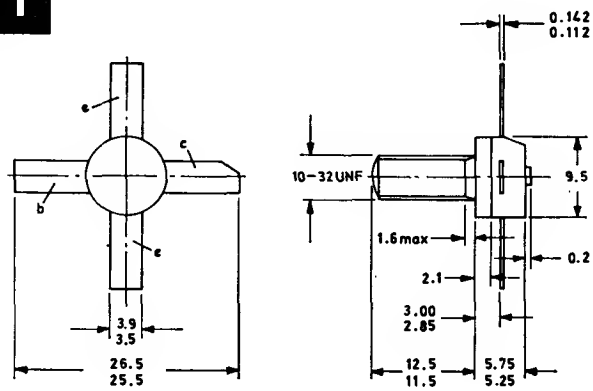
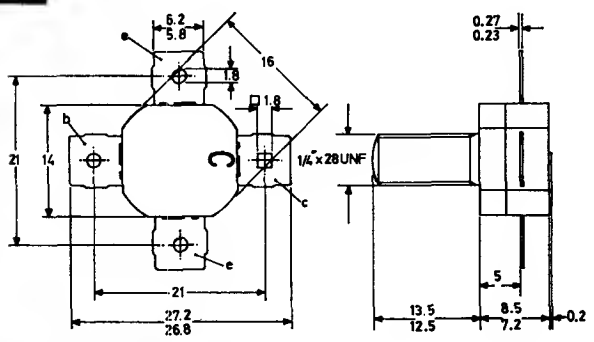


BU



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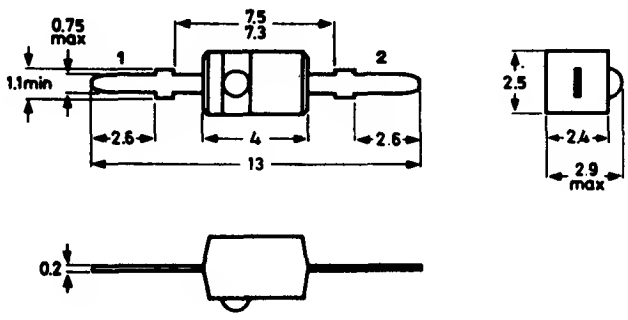
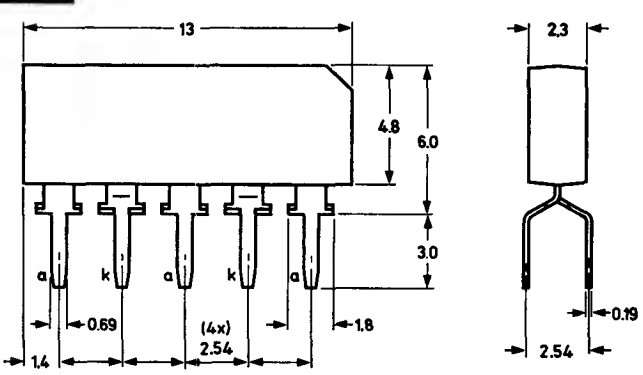
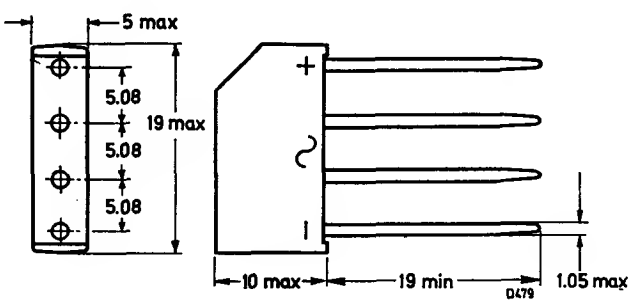


BW



BX



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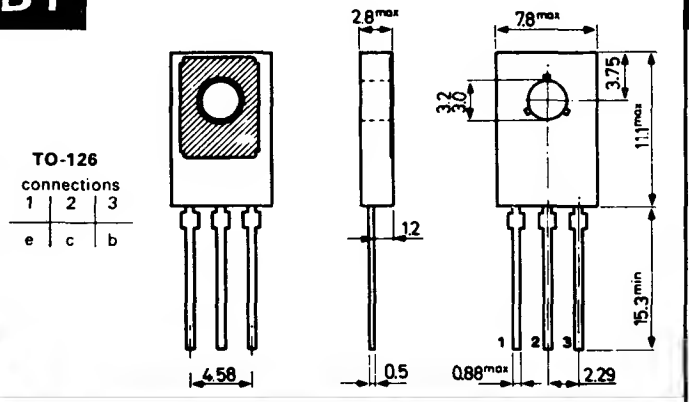
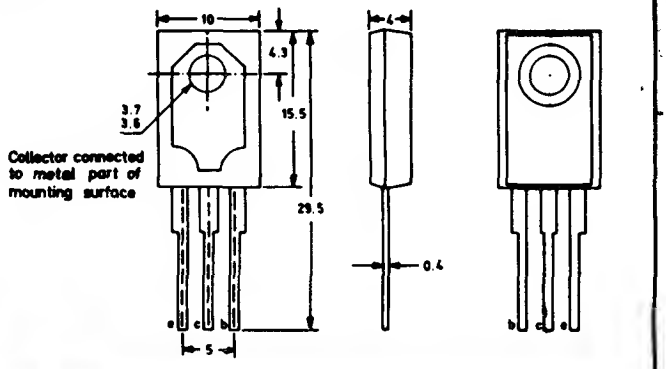
BY



BZ



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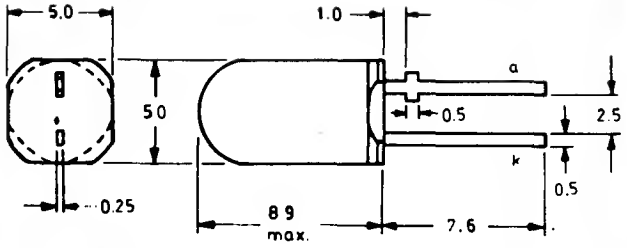

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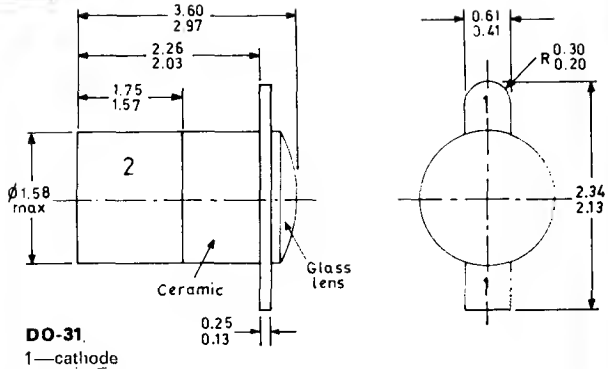

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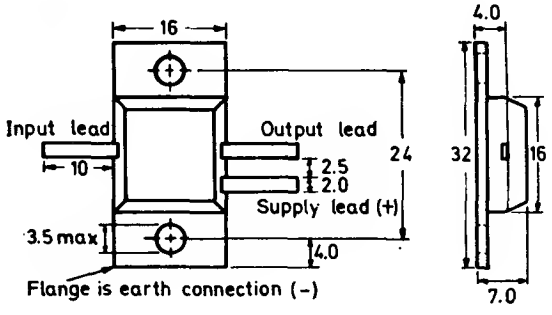

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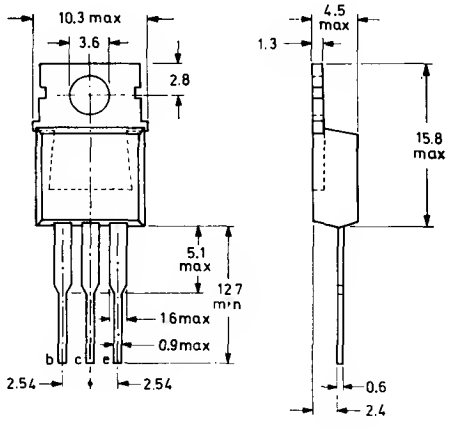

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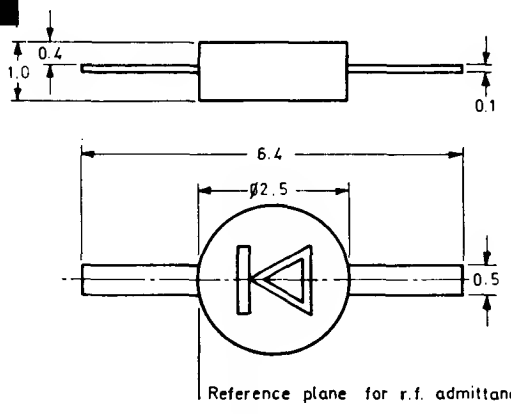

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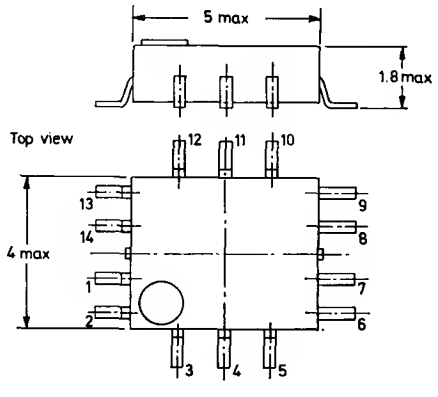

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